

Concurrence Point 1
Purpose and Need and Study Area Defined
and
Concurrence Point 2
Detailed Study Alternatives Carried Forward

TIP Project No. R-5847
WBS 47090.1.1

US 64 Improvements
From NC 141 to US 64 Business
Cherokee & Clay Counties



July 2019

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Consultant Project Manager: Teresa Gresham, Kimley-Horn

Purpose of Today's Meeting:

The purpose of this meeting is to discuss Concurrence Points 1 and 2, identifying a purpose and need as well as defining a study area, and selecting alternatives to study in detail.

1. Introduction and Project Overview

1.1 Proposed Action

The North Carolina Department of Transportation (NCDOT) proposes to improve approximately 9.2 miles of US 64 from NC 141 in Cherokee County to US 64 Business in Clay County. The proposed project is included in the North Carolina Department of Transportation's (NCDOT) *2018-2027 State Transportation Improvement Program (STIP)* as Project R-5847.

Figure 1 shows the project vicinity, and Figure 2 shows the environmental and community features. Figure 3 identifies key travel destinations and adjacent projects. Figure 4 shows design deficiencies and historic crash locations. Figure 5 shows potential turn lane and U-turn locations.

1.2 Meeting Purpose

The purpose of today's meeting is to reach concurrence on Purpose and Need and Study Area for STIP Project No. R-5847 (Concurrence Point 1), and to select alternatives to study in detail (Concurrence Point 2). At today's meeting, NCDOT will present:

- Study area
- Project purpose and need
- Logical termini
- Potential typical sections for further evaluation as part of the detailed study alternative

1.3 Schedule and Document Type

The project is currently state-funded, with the US Army Corps of Engineers (USACE) anticipated to be the lead federal agency due to 404 permitting requirements. NCDOT's current schedule anticipates:

- Planning (State Environmental Assessment/State Finding of No Significant Impact) – March 2020
- Right of Way Acquisition – July 2024
- Construction – June 2029

2. Study Area Description

2.1 Proposed Study Area

The proposed study area is a 1,300-foot wide corridor along the centerline of US 64 from NC 141 to US 64 Business, extending along side streets where improvements are anticipated.

2.2 Land Uses and Notable Features

US 64 is a major east-west route through western North Carolina, providing connectivity between Tennessee and Hendersonville, North Carolina. Within Clay and Cherokee Counties, US 64 connects Hayesville, the only incorporated town in Clay County, to Murphy, the county seat of Cherokee County. Currently US 64 is a two-lane undivided facility throughout the majority of the project area, until transitioning to a five-lane facility with a two-way left-turn lane entering Hayesville approximately 1,000 feet west of US 64 Business.

Land uses surrounding the project corridor are primarily rural, with single family homes on large lots. Agricultural operations are present along the corridor. Land use transitions to commercial on the eastern end of the project as US 64 enters Hayesville.

The following notable resources are within or nearby the study area:

- Nantahala National Forest is located north and west of the project study area (Figure 1).
- The Trail of Tears National Historic Trail is adjacent to the project corridor. The portion of the trail that is within the study area is no longer a physical trail, but two interpretive signs are located adjacent to US 64 and NC 141 (Figures 2A and 2B). Although not listed or eligible for the National Register of Historic Places (NRHP), this resource is locally important.
- The L. Wayne and Mary Etta Anderson house and property has been determined eligible for the NRHP and is located at the intersection of US 64 and Stewart Cove Road (Figure 2D).

2.3 Environmental Features

A field review was conducted with USACE on January 31, 2019. A revised request for preliminary jurisdictional determination was submitted in February 2019. Within the study area there are 49 streams and 71 wetlands. There are no streams designated as High Quality Waters, Outstanding Resource Waters, or water supply watershed WS-I or WS-II in or within 1.0 mile of the study area. Mission Branch and its tributaries are included on the North Carolina 2016 Final 303(d) list of impaired waters due to exceeding the criteria for fecal coliform.

There are thirteen federally protected species listed for Cherokee and Clay Counties (listed in the Appendix). A bat habitat assessment performed in August 2018 noted presence of the gray bat. The USACE has designated the watershed in which the study area is located as a trout watershed; however, in a comment letter from March 2018, a trout moratorium was specifically not requested. A seasonal restriction on certain in-stream activities from mid-August through November was recommended during the reproductive period for the Eastern hellbender.

3. Concurrence Point 1 – Purpose and Need

3.1 Summary of Need

Section 3.1 summarizes the needs; Section 3.2 provides additional supporting data.

Regional Mobility:

- Mobility may be reduced for ambulances accessing the Murphy Medical Center, the only hospital in western North Carolina, due to inconsistent travel speeds, average speeds below posted travel speeds, and inability to pass other vehicles.
- Travel speeds along the corridor are at times inconsistent due to the number of driveways, slow moving vehicles, and traffic volumes. This issue is exacerbated during periods of higher traffic volumes (such as tourist seasons and events) and periods with higher numbers of slow-moving vehicles (such as trucks, tractors, and school buses). Turning vehicles also slows traffic and reduces mobility. In addition to emergency vehicles, this affects commuting traffic, school buses, and visitors.

System Linkage:

- It provides local access to Murphy Medical Center, Tri-County Community college, and Hayesville, the county seat of Clay County and regional access to Chattanooga, Atlanta, Asheville, and numerous tourism destinations in the region. Murphy Medical Center is located on NC 141 by US 64, near the western terminus of the project.
- US 64 provides the only direct east-west connection between Hayesville and Murphy. Regionally, US 64 is also a major east-west route in western North Carolina, connecting to major destinations both in and outside of North Carolina.

Safety & Facility Deficiencies:

- Existing travel lanes vary between 10 and 11 feet wide compared with AASHTO's guidance of 12 feet, and some shoulder sections are below recommended widths. Several segments have geometric features that do not meet current AASHTO design standards. US 64 is listed as a boulevard needing improvement in both the Cherokee and Clay Counties Comprehensive Transportation Plans.
- The crash rate on this segment is above the critical crash rate and crashes included four fatal crashes, two of which occurred during a passing maneuver.
- Full-movement intersections have more potential conflict points than restricted-access intersections. All intersections along this corridor are full-movement. In addition, left turn lane reduce potential conflicts between turning and through vehicles.
- A consistent corridor width reduces variability for drivers which creates a safer driving experience.

3.2 Proposed Project Purpose

The purpose of this project is to improve mobility on US 64 from NC 141 to US 64 Business by addressing facility deficiencies on 95% of the corridor, reducing conflict points while maintaining access to driveways and side streets, and providing additional passing opportunities for emergency vehicles and other drivers.

3.3 Supporting Data

The following sections include key information; additional detail is in the Appendix.

Regional Mobility:

Traffic Volumes

The project-level traffic forecast projects traffic volumes on this section of US 64 to be between 10,600 and 16,200 vpd (see 2045 Build scenario traffic forecast diagrams in the Appendix). Traffic volumes in the region vary seasonally, with tourists increasing traffic volumes in the region during the summer and fall months. Additionally, US 64 sees an increase in traffic during fishing competitions held nearby at Chatuge Lake, located east of Hayesville.

Vehicle Mix

There is a total of 7% truck traffic on this section of US 64, with 5% categorized as dual axle trucks (Duals) and 2% categorized as tractor trailer semi-trucks (TTSTs). Larger, slower moving vehicles such as farm equipment and logging trucks use this route. School buses use this corridor and have stops on both sides of the road.

Travel Speeds

Although traffic volumes do not warrant a 4-lane road, drivers are often unable to pass slower vehicles due to the combination of the volumes with the level of turning traffic and percent of slow-moving vehicles. With lack of passing opportunities and turning traffic, average speeds on US 64 are 6-13% lower than the posted speed limit. This affects all drivers, but is most critical to emergency responders traveling west toward the Murphy Medical Center on NC 141.

The posted speed limit is 45 mph from US 64 Business to Jonquil Lane (approximately 1 mile) before transitioning to 55 mph for the remainder of the corridor. The current average speed limit is 51.4 mph for eastbound traffic and 48.1 mph for westbound traffic.

Ability to Maintain Speed

Due to limited opportunities to pass slower moving vehicles, travel speeds along the corridor can be inconsistent. This issue is exacerbated during periods of higher traffic volumes (such as tourist seasons and events) and periods with higher numbers of slow-moving vehicles (such as trucks, tractors, school buses).

Based on current traffic volumes, drivers spend up to 48% of their time behind other vehicles (“percent time spent following”), and this is anticipated to increase to up to 57% by the design year. While percent time following alone may not indicate a concern, this percentage combined with the lower-than-posted average speed limit indicates a high likelihood that drivers want to pass more often than they are able to. This may lead to vehicles following others at close distances and unsafe passing maneuvers.

Turning vehicles also slows traffic and reduces mobility. Vehicles currently have unlimited access for left and right turns along the corridor. There are approximately 160 driveways along the corridor, about 60% of which are commercial, agricultural, or institutional. School buses stop on US 64 in the mornings and afternoons.

System Linkage:

Economy and Community

US 64 is the primary connection between many major regional destinations in western North Carolina, shown on Figure 3. The project corridor connects Hayesville and Murphy, the county seats of Clay and Cherokee Counties respectively. Harrah’s Cherokee Valley River Casino & Hotel is in Murphy. Additionally, it provides access to Tri-County Community College and Murphy Medical Center located on NC 141, which is the only hospital in western North Carolina.

US 64 is part of the broader regional roadway network, providing access to the major routes in western North Carolina. This network provides access to Asheville, Tennessee, Georgia, and the national forests in the region.

Safety & Facility Deficiencies:

Facility Deficiencies

Several locations along US 64 have geometric features that do not meet current AASHTO design standards. Local plans propose widening US 64 to four lanes in Clay and Cherokee Counties. In addition, US 64/74 west of Murphy is identified for improvement to act as a connector between western North Carolina and Chattanooga, Tennessee and Atlanta, Georgia.

Crash Data

The existing two-lane undivided roadway has unlimited access. Crash data was collected for the project corridor for the five-year period from October 1, 2013 to September 30, 2018.

- The total crash rate for this corridor is 171.06 crashes per 100 million vehicle miles traveled (MVMT), which is higher than the critical crash rate for the corridor (167.42 per MVMT).
- Four fatal crashes occurred on US 64 in the corridor, one of which involved a pedestrian and two of which involved vehicles making a passing maneuver.
- Approximately 45% of all rear end crashes occurred between Town Mountain Road and Sunrise Place, a 1.4-mile stretch.

Conflict Points

- Traditional intersections have 32 potential conflict points compared with 14 potential conflict points for a superstreet intersection (see graphics in appendix).
- Unexpected situations create potential conflicts for drivers, including drivers turning left from the through lane or lane shifts.

4. Logical Termini

4.1 Proposed Project Termini

The proposed project begins approximately 4 miles east of Murphy at the US 64/NC 141 intersection, tying into the eastern end of Project R-0977A (completed in 2009). Project R-5847 continues the improvements built under Project R-0977A which also focused on providing a safe and efficient route through western North Carolina. Since the section of US 64 from Murphy to NC 141 was recently modernized and built on new location, there are limited driveways and no facility deficiencies to address.

The proposed project ends in Hayesville at the US 64/US 64 Business intersection, tying into the existing US 64 five-lane typical section and the US 64 Business improvements proposed as part of Project R-5863. Local and regional traffic patterns diverge at this location, providing an ideal location for a terminus.

4.2 Current and Past Adjacent Projects

The following projects are shown on Figure 3:

- STIP Project B-5911, which proposes to replace the bridge carrying Fires Creek Road over Sweetwater Creek with a culvert, is included as part of Project R-5847 (Figure 2E). The existing bridge is functionally obsolete and scour critical. The bridge is approximately 100 feet north of US 64, and anticipated to be within the impact area of Project R-5847.
- STIP Project R-5863 proposes to upgrade US 64 Business from US 64 to SR 1307 (Main Street) in Hayesville, including bike lanes and curb and gutter. This project is scheduled for right-of-way acquisition in FY 2019 and construction in FY 2021.
- STIP Project R-0977A relocated the section of US 64 between US 19-74-129 and east of NC 141 to south of the Hiwassee River in 2009. A two-lane facility was constructed, but the right-of-way for a four-lane section was acquired, graded, and filled. The purpose of the project was to provide a safe, efficient, and direct route for traffic traveling east-west through Cherokee County with provisions for additional capacity as traffic volumes grow.
- STIP Project A-0011C proposes to widen NC 69 to a four-lane median divided facility from US 64 in Hayesville to the Georgia State Line. Right-of-way acquisition is scheduled for FY 2018 and construction in FY 2019.
- STIP Project R-5922 proposes to improve US 64 from NC 175 to Old Highway 64 E east of Hayesville. The project is scheduled for right-of-way acquisition in FY 2025 and construction in FY 2027.

5. Concurrence Point 2 – Alternatives Considered

5.1 Build Alternatives to Carry Forward for Detailed Study

NCDOT proposes to carry forward one Best-Fit Build Alternative for detailed study. NCDOT proposes to build a safe facility that addresses the project needs while minimizing impacts in a practicable manner.

Proposed Typical Sections:

The Best-Fit Build Alternative proposes improving US 64 using a varying typical section to minimize impacts while addressing needs along the corridor. Two typical sections are proposed:

- Two-lane median divided roadway, with a continuous passing lane (“2+1”) – the passing lane will be applied as needed eastbound and westbound. A passing lane is anticipated in areas:
 - With longer distances between passing opportunities.
 - Where passing is difficult (high percent time following indicates vehicles are unable to pass because of high traffic volumes in the opposite direction).
- Four-lane median divided roadway. A four-lane typical section would be appropriate in areas:
 - With higher traffic volumes (over 15,100 vpd, based on NCDOT Guidance: https://connect.ncdot.gov/projects/planning/TransPlanManuals/Standard_Tables.pdf)
 - With higher demand for turns into driveways and side streets (denser driveways).
 - With access points generating higher numbers of large, slower vehicles (major truck or bus generators).

The following median and intersection designs are proposed:

1. A 17.5-foot median is proposed along the corridor. This narrower median (compared with NCDOT’s standard guidance of a 23-foot median for a 55-mph corridor) has been proposed to minimize impacts. A constant-width median is proposed to reduce the “accordion effect” of widening the median only at turn lane locations. The median is proposed to provide the following benefits:
 - To improve mobility and safety along the corridor by providing drivers a consistent travel path (i.e., to reduce the “accordion” effect of having the road widen and narrow alternatingly throughout the corridor).
 - To reduce conflict points.
 - To accommodate left-turn lanes at intersections.
2. A reduced-conflict intersection design is proposed for both typical sections. Also known as a superstreet, this type of facility improves operational efficiency and safety by reducing vehicular conflict points.

Anticipated Design:

- A 17.5-foot median along the corridor will accommodate left turn lanes where appropriate. Based on potential turn locations, approximately 50% of the corridor is anticipated to include either a left turn or a U-turn in either the westbound or eastbound direction (see Figure 5).
- Passing lanes would be to the right of the through travel lane as needed (locations to be determined).
- The 2+1 median-divided typical section will likely be appropriate between NC 141 and Old US 64 (9.1 miles), currently a 2-lane section.
- The 4-lane median-divided typical section will likely be appropriate between Old US 64 and US 64 Business (0.1 miles), currently a 5-lane section.

These anticipated design assumptions will be confirmed during the design phase, and will be presented to the Merger Team during the C.P. 2A meeting.

5.2 No Build Alternative

The No Build Alternative is a baseline comparative alternative. The No Build Alternative would continue typical maintenance activities but would not make any substantial improvements to the US 64 corridor. This alternative would result in no new construction costs; no impacts to streams, wetlands, or other

natural or cultural resources; and no residential or business relocations. However, this alternative would not meet the purpose of the project. The No Build Alternative provides a basis for comparing the adverse impacts and benefits of the study alternatives.

5.3 Eliminated Alternatives

Alternative Modes of Travel

There are no existing transit services along the project corridor. The addition of a bus service would add additional slow-moving vehicles to US 64 and thus, not improve mobility through the corridor. This alternative would not meet the purpose of the project.

Transportation Systems Management

There is only one traffic signal along the corridor, therefore no opportunity to improve mobility through signal coordination. Additionally, ramp metering and similar transportation systems management are not applicable to this corridor.

New Location Alternative

A roadway on new location would require extensive impacts to streams, wetlands, and the surrounding community. It would require additional residential and business relocations. Due to these factors, it determined that a new location alternative is not reasonable and feasible.

Best-Fit Widening Without Median

A best-fit alternative using a varying typical section as described in Section 5.1 without the median would allow all driveways and cross-streets to remain full-movement. This would not reduce conflict points along the corridor. Installing a barrier rather than median would reduce conflict points but has the potential to introduce sight-distance issues, which would introduce a facility deficiency and would not meet the purpose of the project. Additionally, a barrier would require inside roadway shoulders that may cause the total roadway width to be comparable to a median-divided facility. The lack of a median as well as the number and spacing of intersections would result in an inconsistent roadway width throughout the corridor, creating an “accordion” type of condition where the road constantly widens at turn lane locations then immediately narrows down again. This may subvert driver expectations. Due to these factors, this alternative would not meet the purpose of the project.

Figures

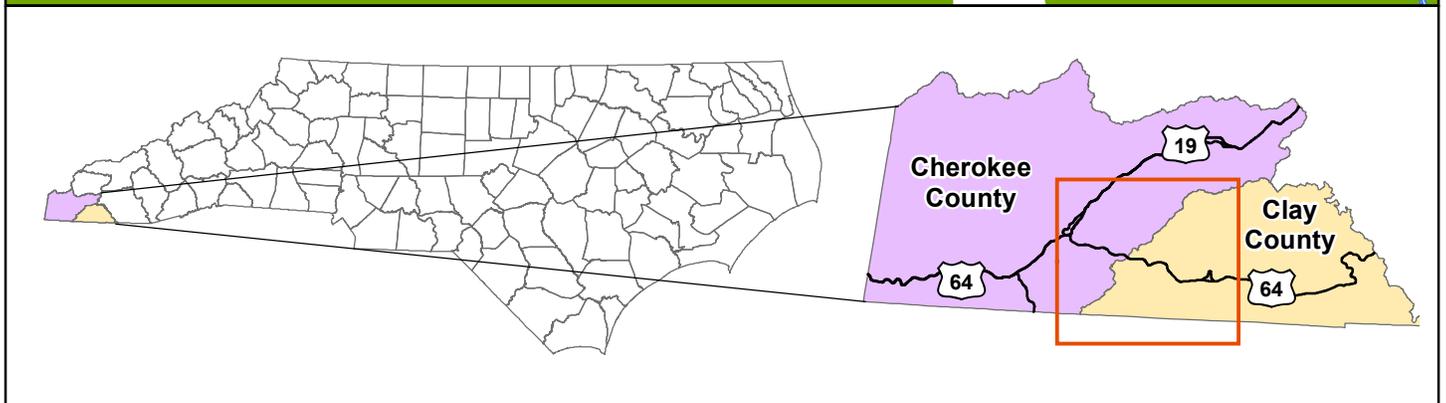
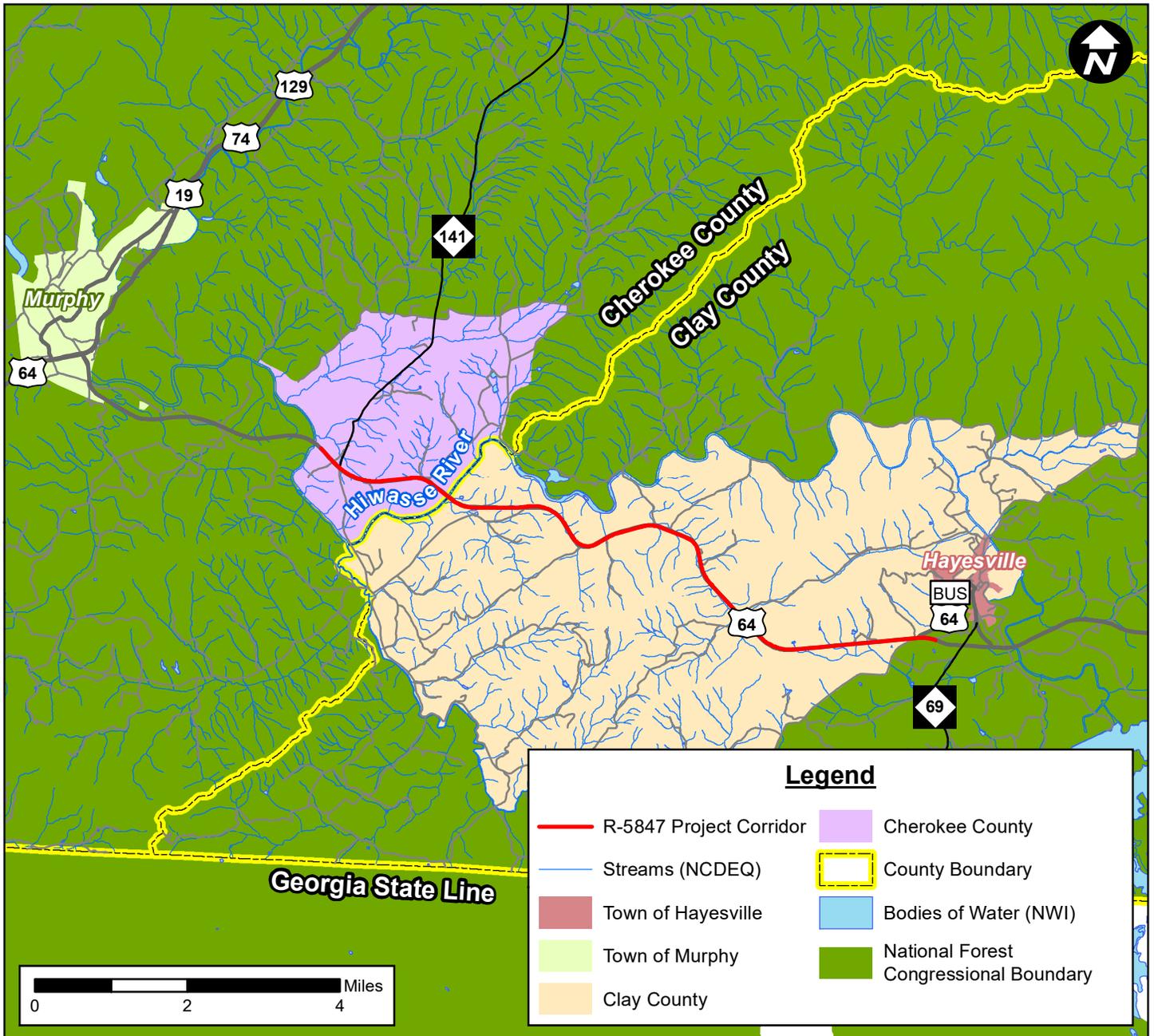
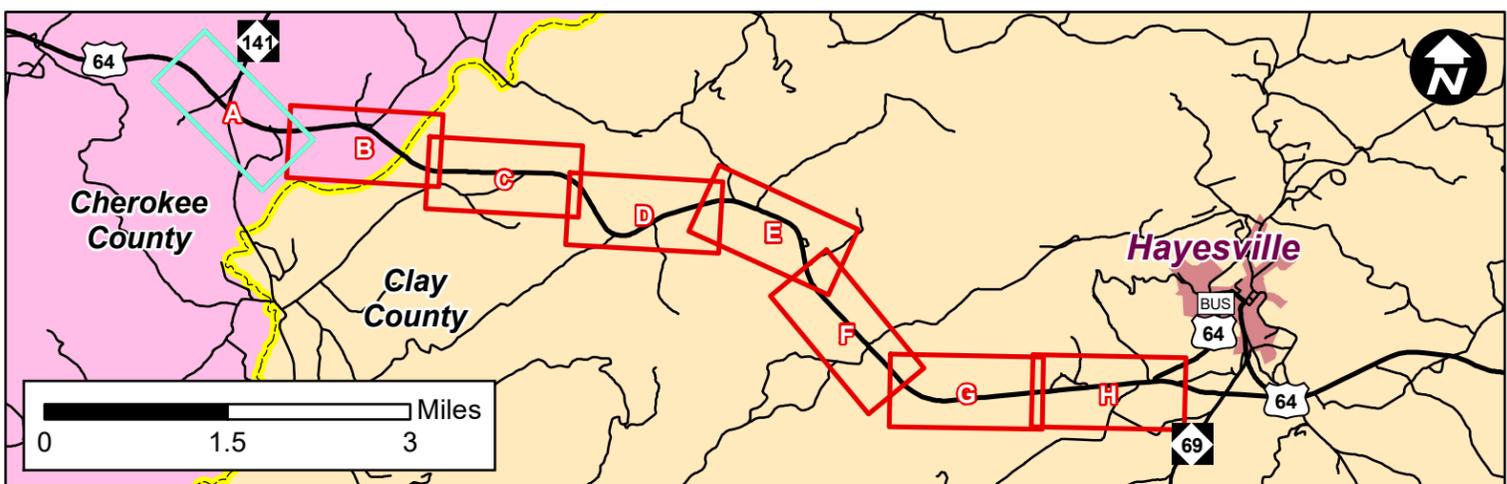


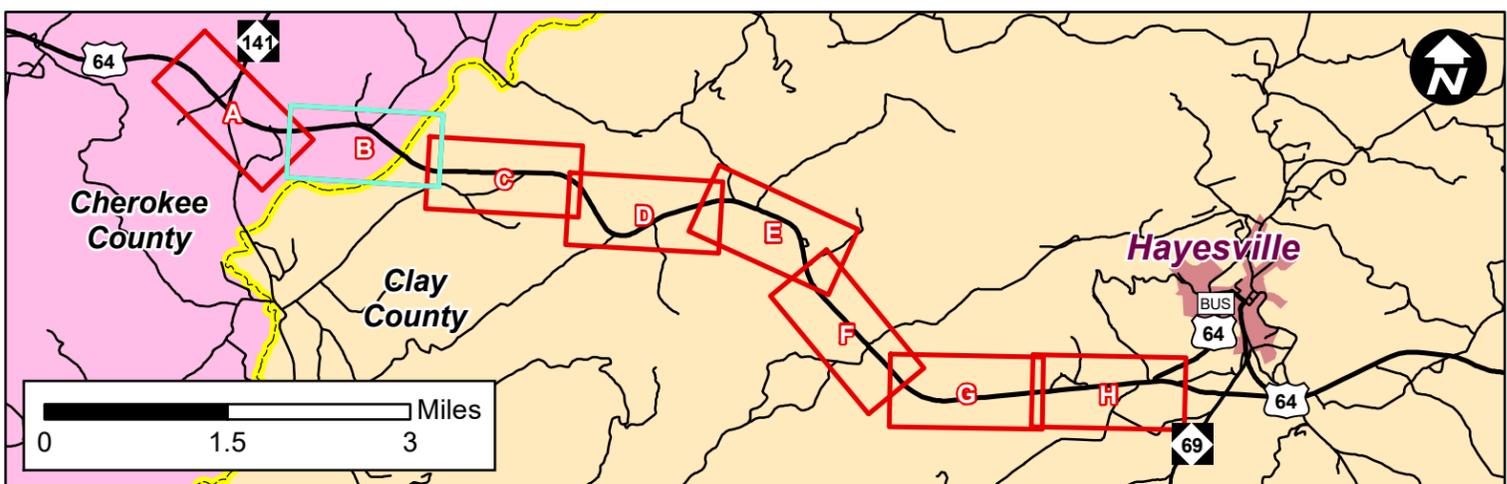
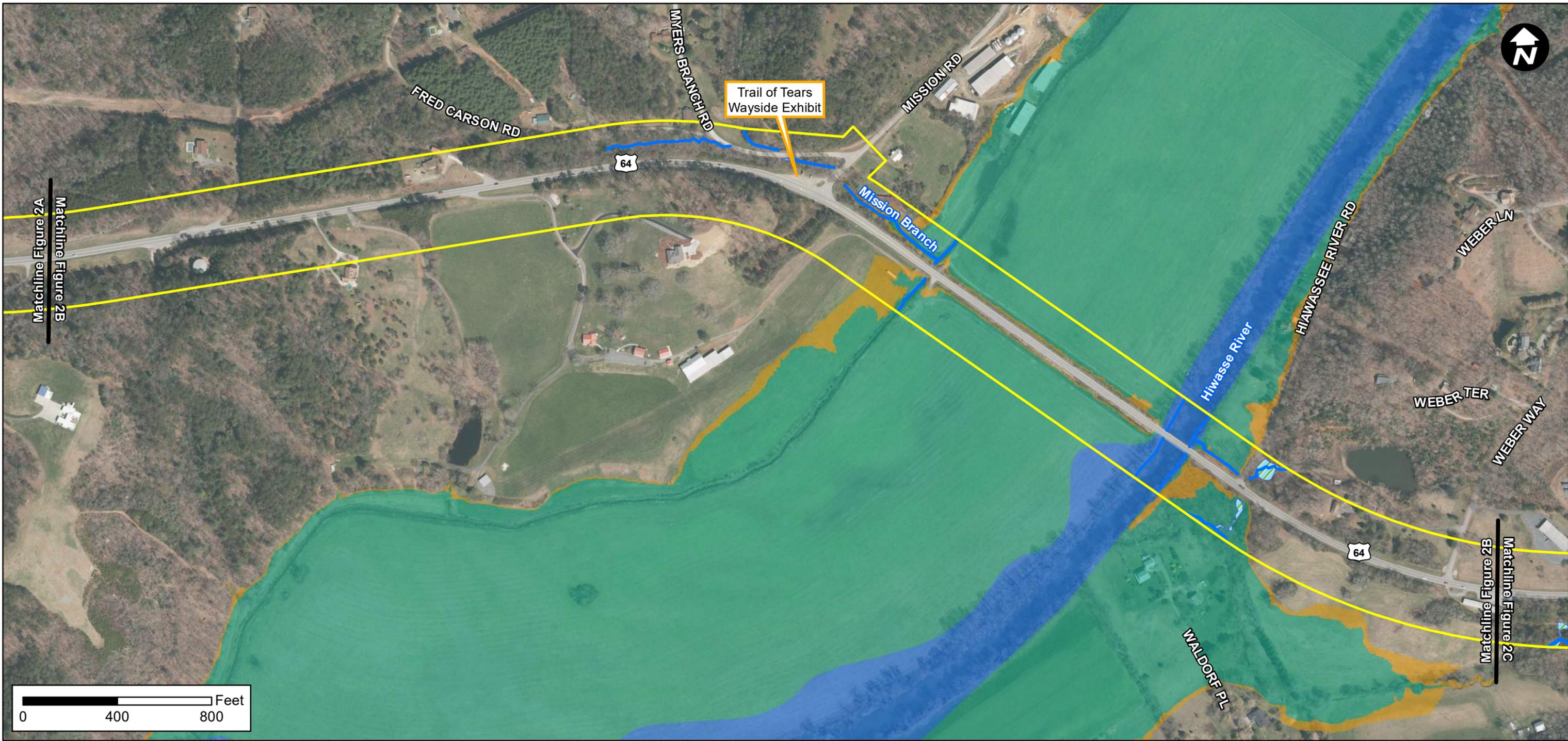
Figure 1: Vicinity Map
 STIP No. R-5847
 U.S. 64 Widening
 From NC 141 to US 64 Bus
 Cherokee and Clay Counties, NC



- Legend**
- Project Study Area
 - Business
 - Community Resource
 - Other Notes
 - Delineated Streams
 - Delineated Wetland
 - Floodway
 - 100-Year Floodplain
 - 500-Year Floodplain

Figure 2A: Environmental Features
 STIP No. R-5847
 Widening of U.S. 64
 From NC 141 to US 64 Bus
 Cherokee and Clay Counties



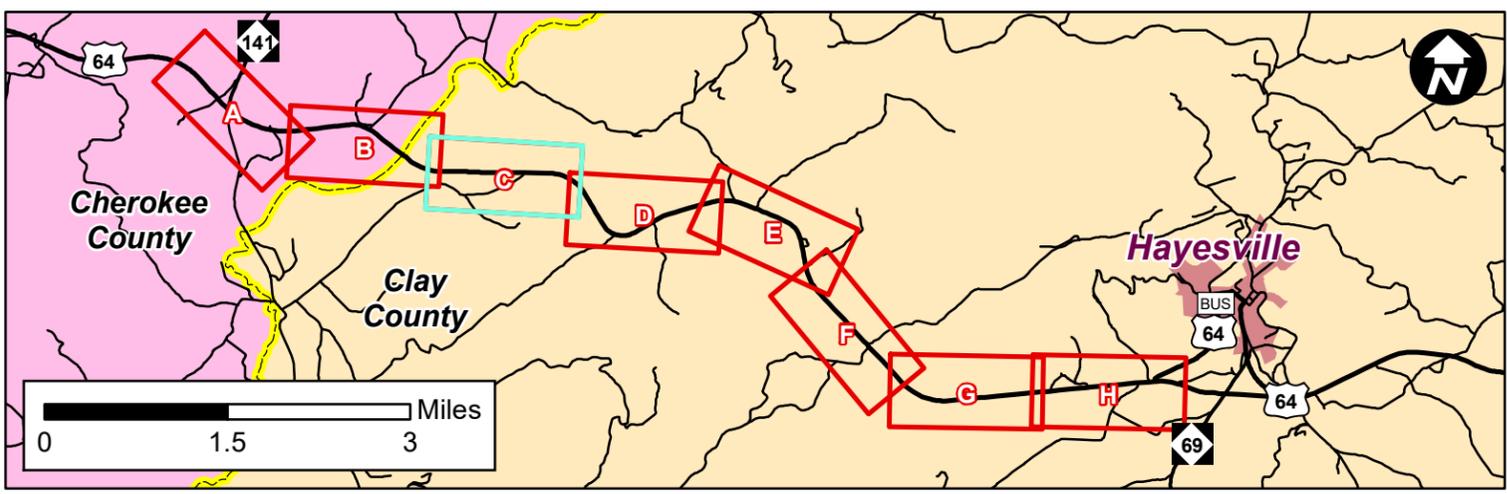
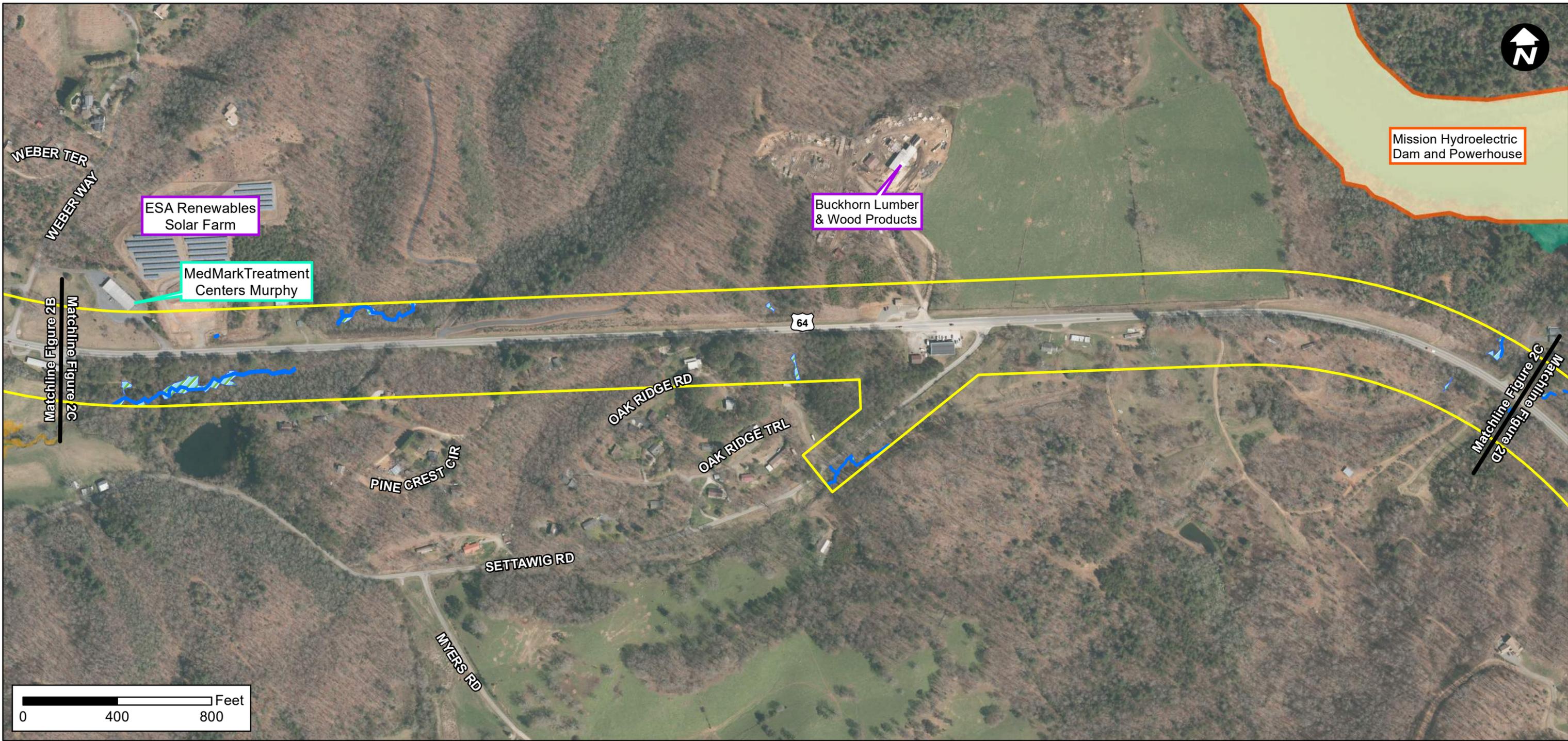


Legend

- Project Study Area
- Business
- Community Resource
- Other Notes
- Delineated Streams
- Delineated Wetland
- Floodway
- 100-Year Floodplain
- 500-Year Floodplain

Figure 2B: Environmental Features
 STIP No. R-5847
 Widening of U.S. 64
 From NC 141 to US 64 Bus
 Cherokee and Clay Counties



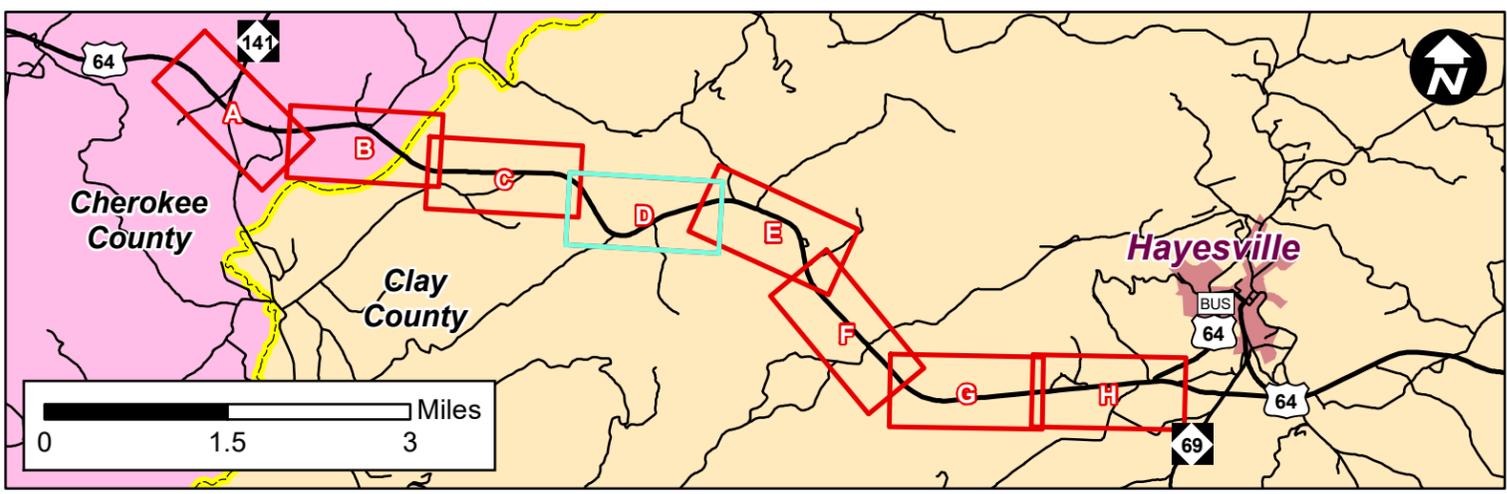
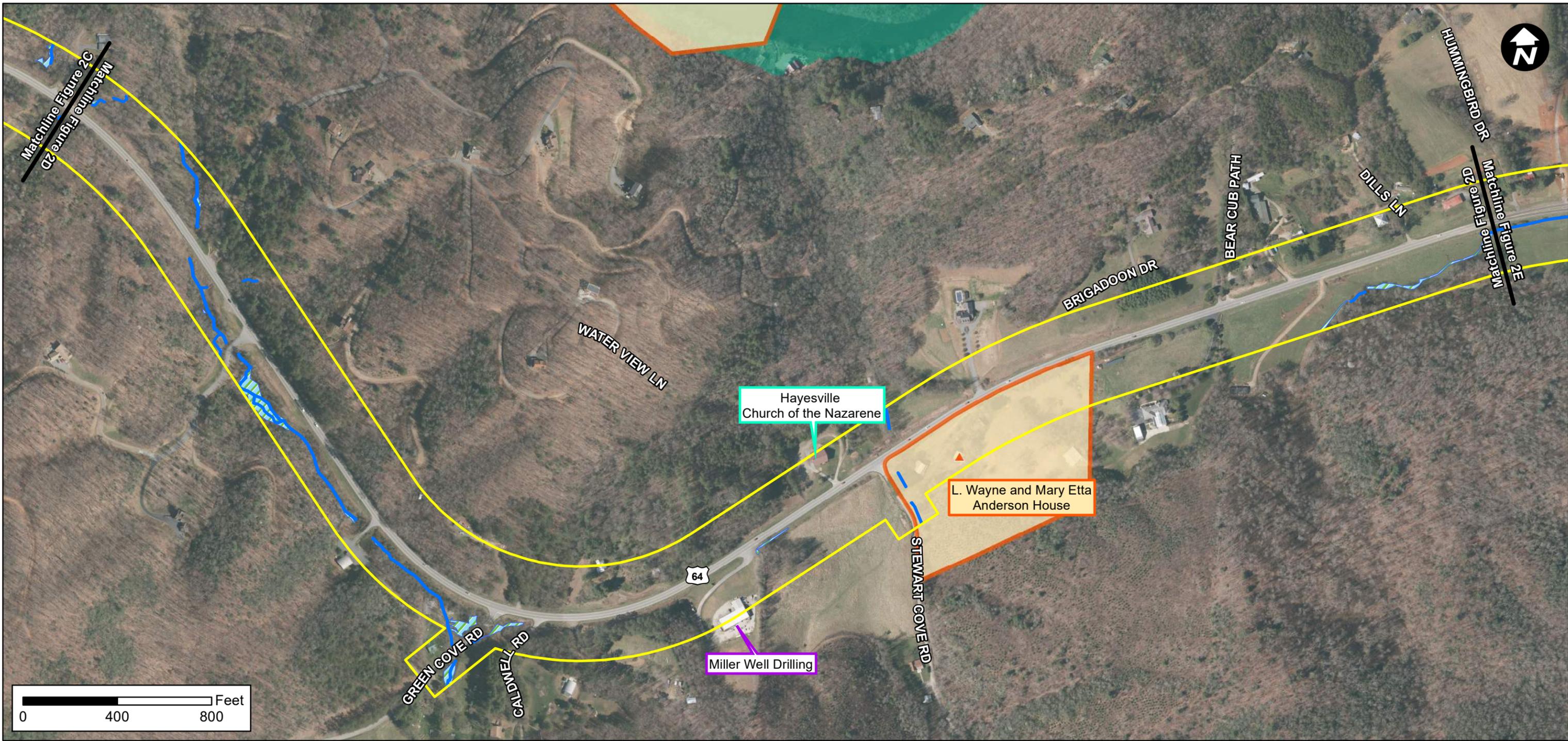


Legend

- Project Study Area
- Business
- Community Resource
- Other Notes
- Delineated Streams
- Delineated Wetland
- 100-Year Floodplain
- 500-Year Floodplain
- Determined Eligible for National Register

Figure 2C: Environmental Features
 STIP No. R-5847
 Widening of U.S. 64
 From NC 141 to US 64 Bus
 Cherokee and Clay Counties

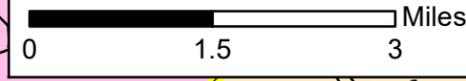
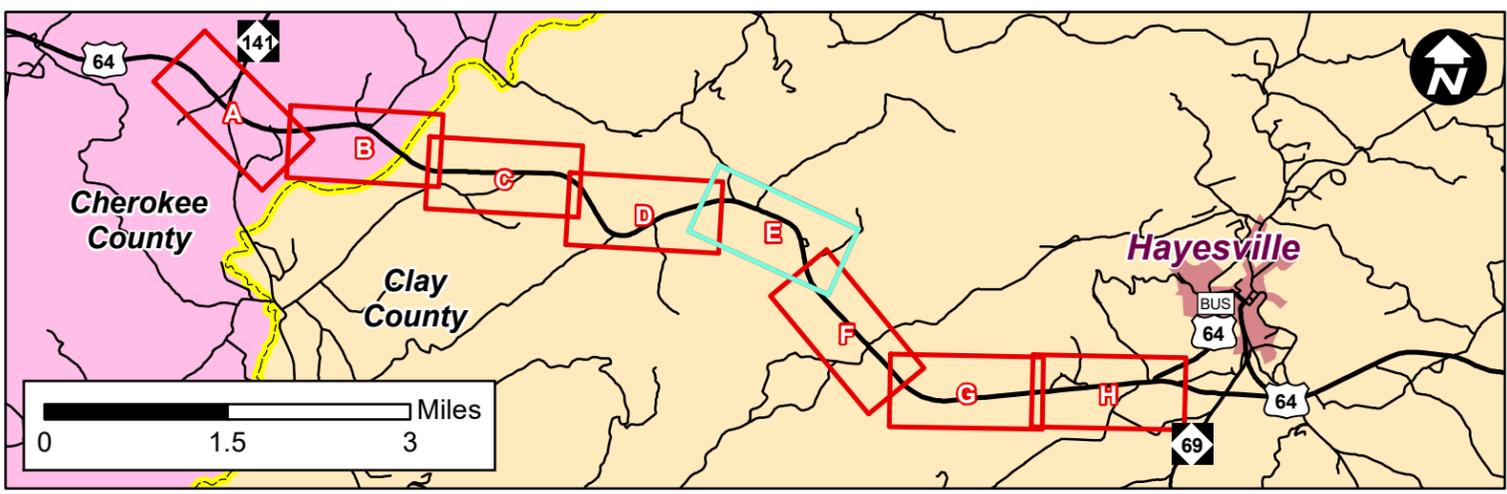
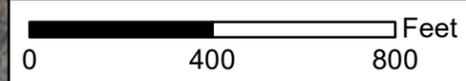




Legend

- Project Study Area
- Delineated Streams
- Delineated Wetland
- 100-Year Floodplain
- ▲ Determined Eligible for National Register
- Determined Eligible for National Register
- Business
- Community Resource
- Other Notes

Figure 2D: Environmental Features
 STIP No. R-5847
 Widening of U.S. 64
 From NC 141 to US 64 Bus
 Cherokee and Clay Counties

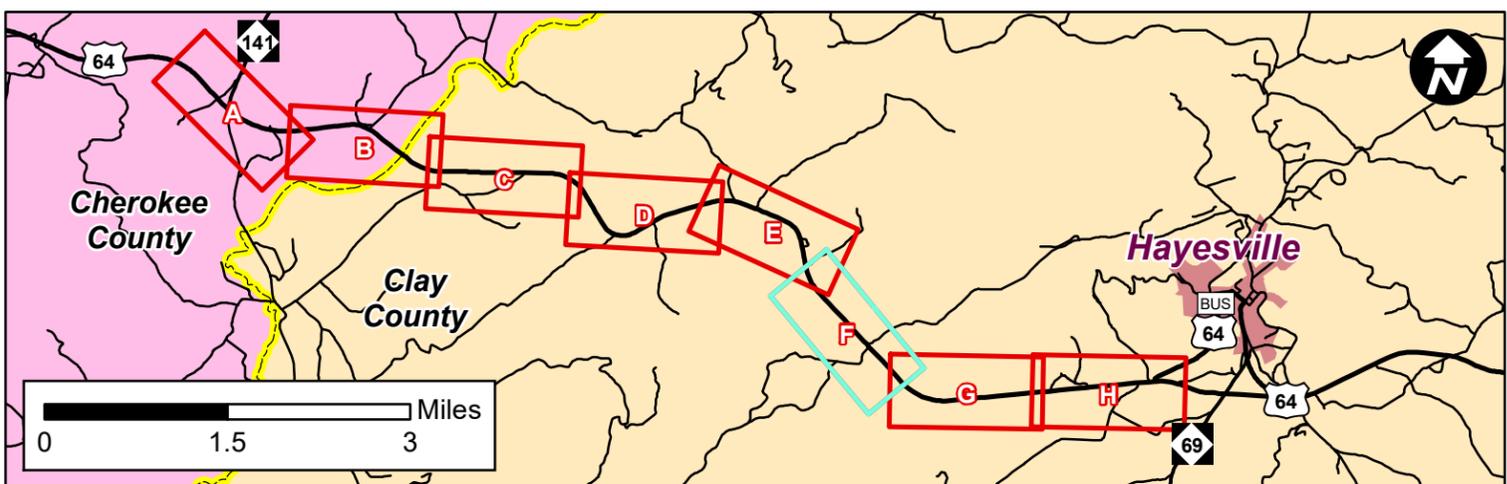
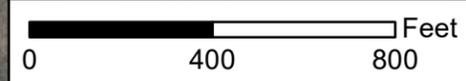
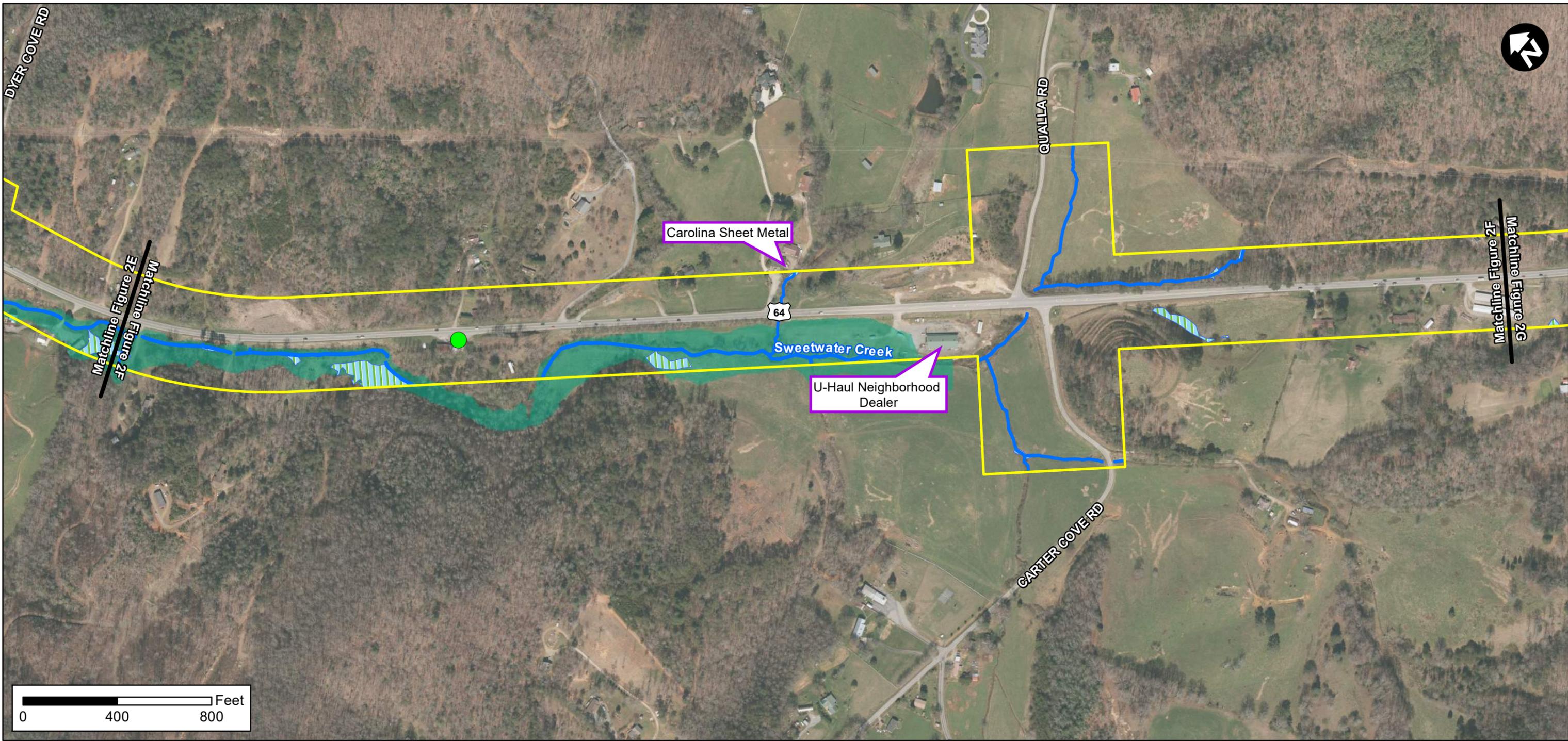


Legend

- Business
- Community Resource
- Other Notes
- Project Study Area
- GeoEnvironmental Site of Concern
- Delineated Streams
- Delineated Wetland
- 100-Year Floodplain

Figure 2E: Environmental Features
 STIP No. R-5847
 Widening of U.S. 64
 From NC 141 to US 64 Bus
 Cherokee and Clay Counties



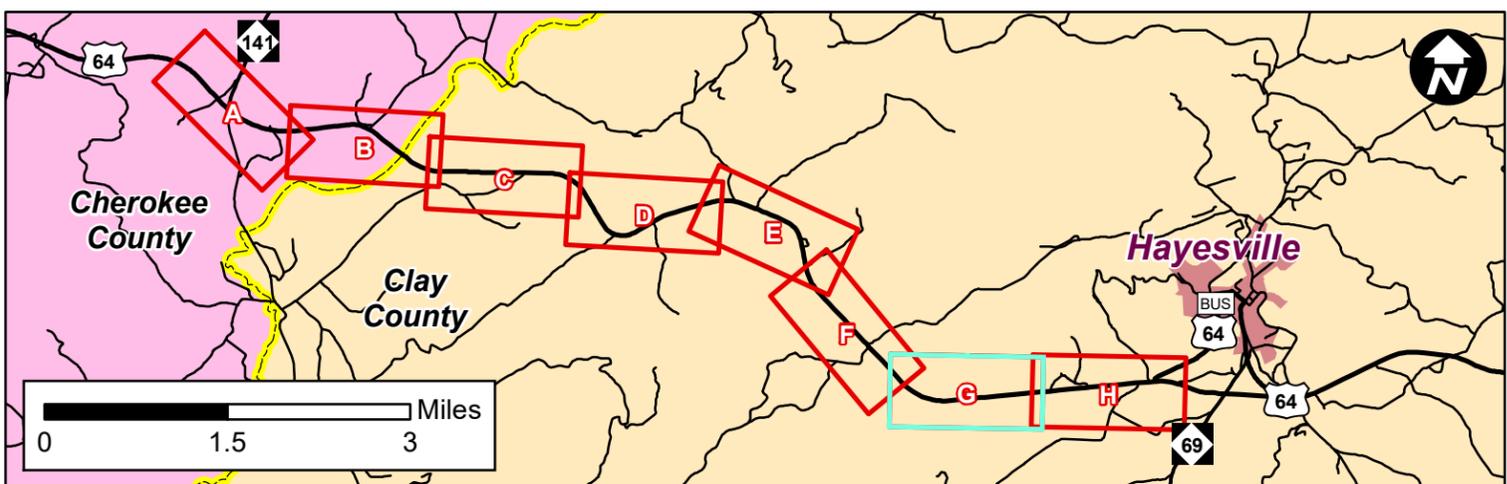


Legend

- Business
- Community Resource
- Other Notes
- Project Study Area
- GeoEnvironmental Site of Concern
- Delineated Streams
- Delineated Wetland
- 100-Year Floodplain

Figure 2F: Environmental Features
 STIP No. R-5847
 Widening of U.S. 64
 From NC 141 to US 64 Bus
 Cherokee and Clay Counties

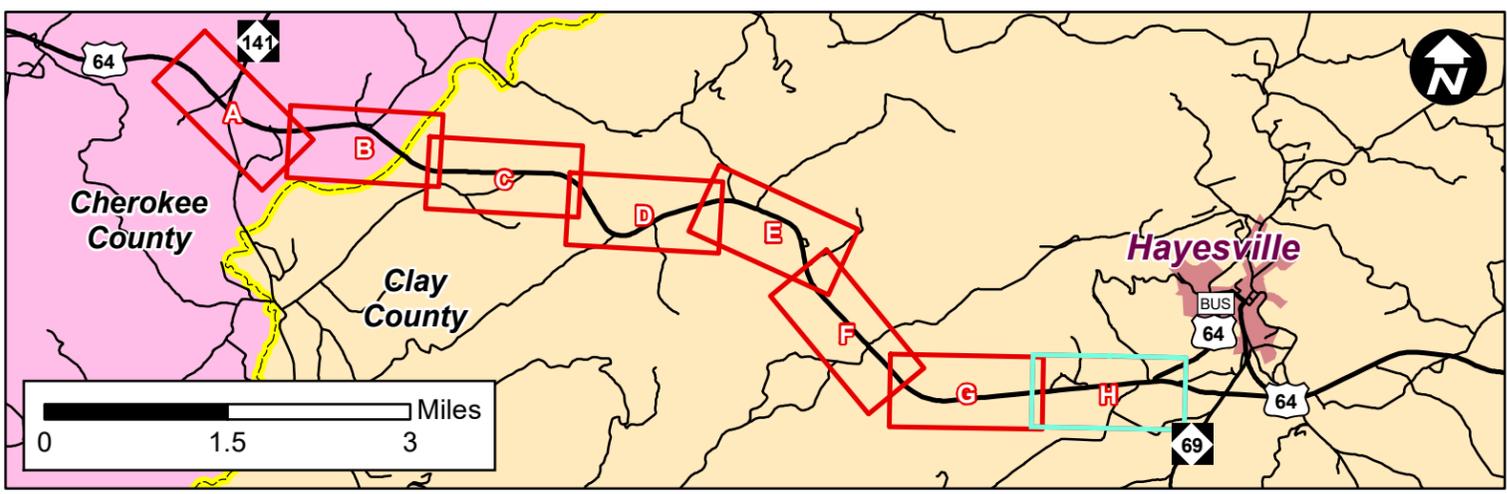
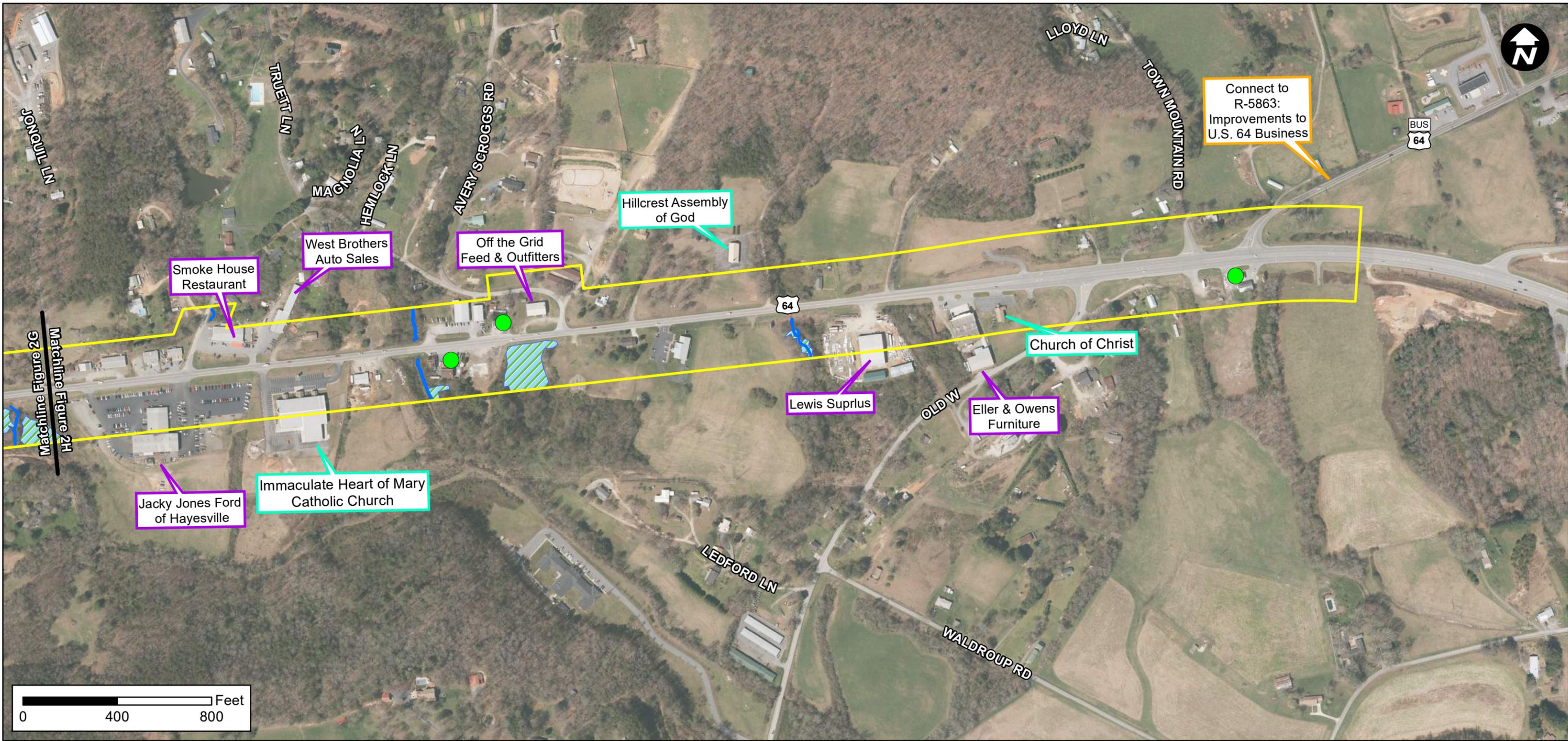




- Legend**
- Business
 - Community Resource
 - Other Notes
 - Project Study Area
 - GeoEnvironmental Site of Concern
 - Delineated Streams
 - Delineated Pond
 - Delineated Wetland

Figure 2G: Environmental Features
 STIP No. R-5847
 Widening of U.S. 64
 From NC 141 to US 64 Bus
 Cherokee and Clay Counties



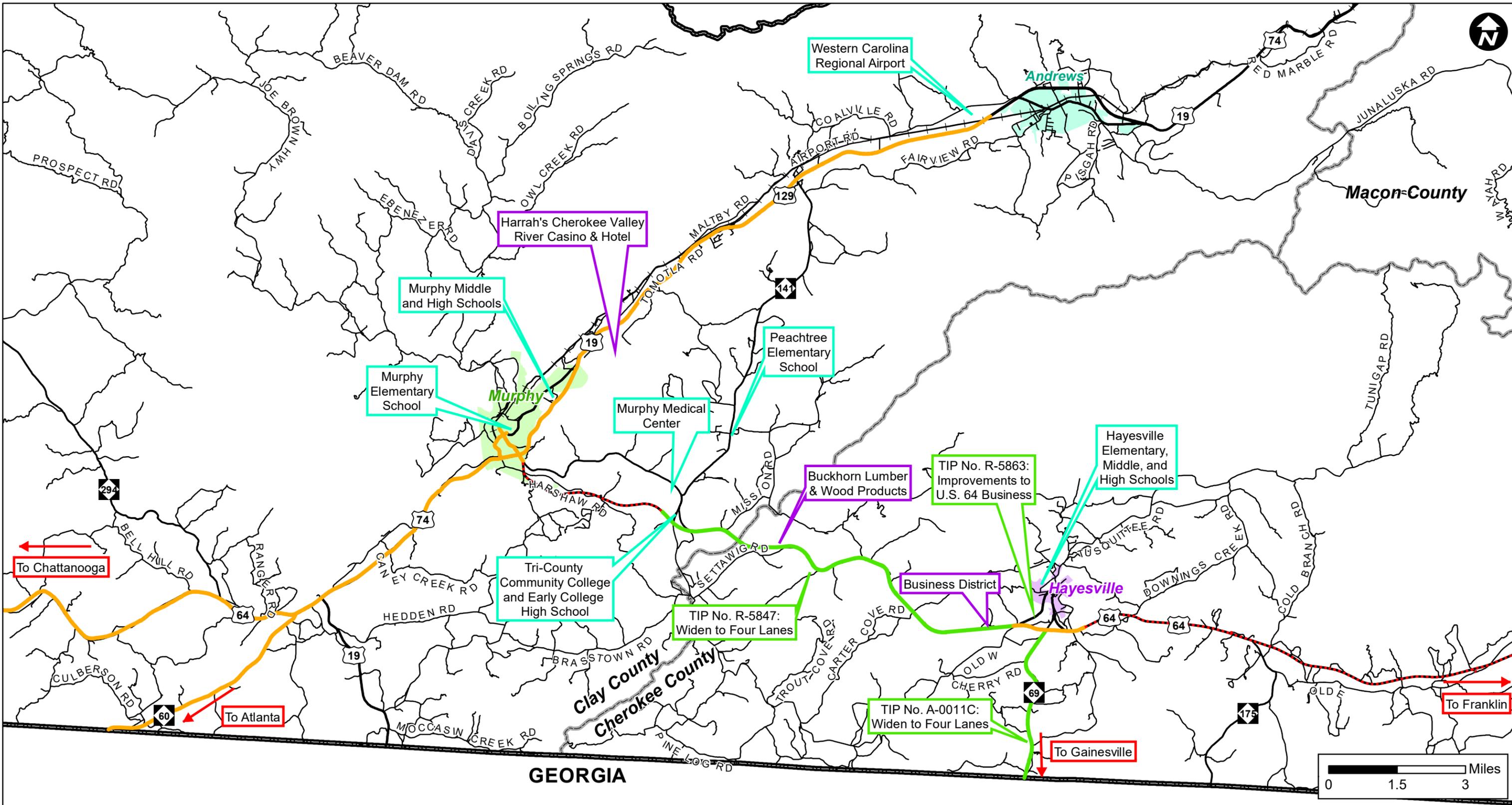


Legend

- Project Study Area
- Business
- Community Resource
- Other Notes
- GeoEnvironmental Site of Concern
- Delineated Streams
- Delineated Wetland

Figure 2H: Environmental Features
 STIP No. R-5847
 Widening of U.S. 64
 From NC 141 to US 64 Bus
 Cherokee and Clay Counties





Legend

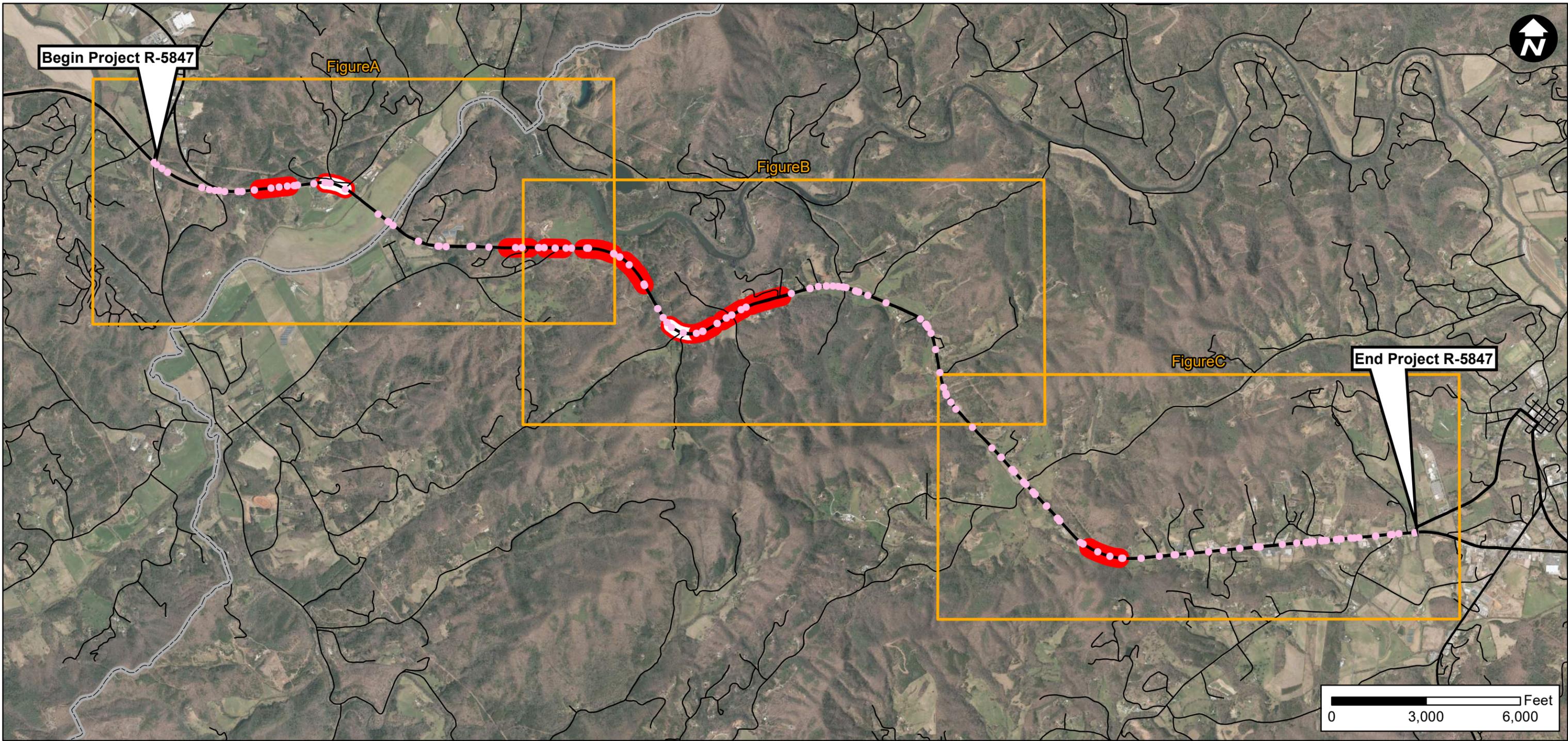
- Business
- Community Resource
- Proposed Project

- Existing 4-Lane Road*
- Proposed 4-Lane Road
- CTP Recommended 4-Lane Road
- Town of Andrews
- Town of Murphy

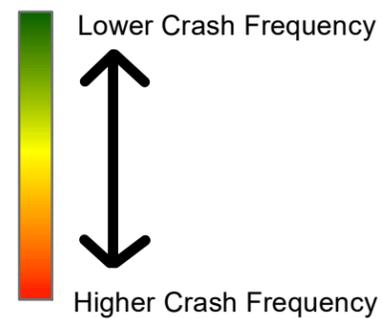
- Town of Hayesville
- County Boundary
- State Boundary

*All other roads are two lane. Local roads not shown.

Figure 3
Key Travel Destinations and Adjacent Projects
 NCDOT Project No. R-5847
 Widening of U.S. 64
 Clay and Cherokee Counties



Legend

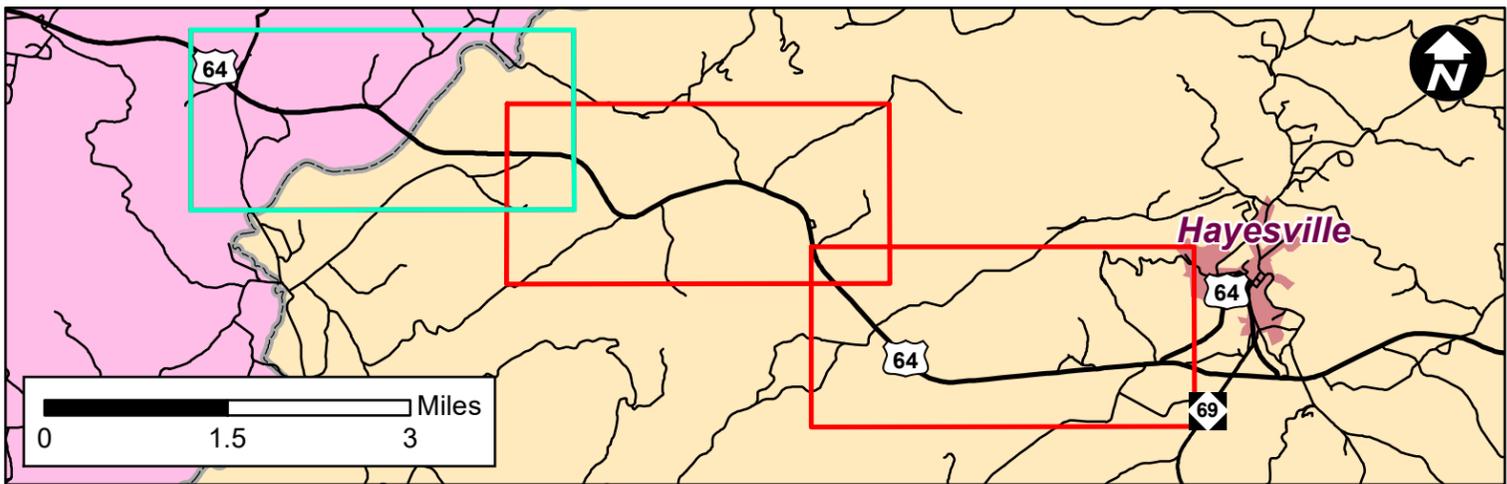
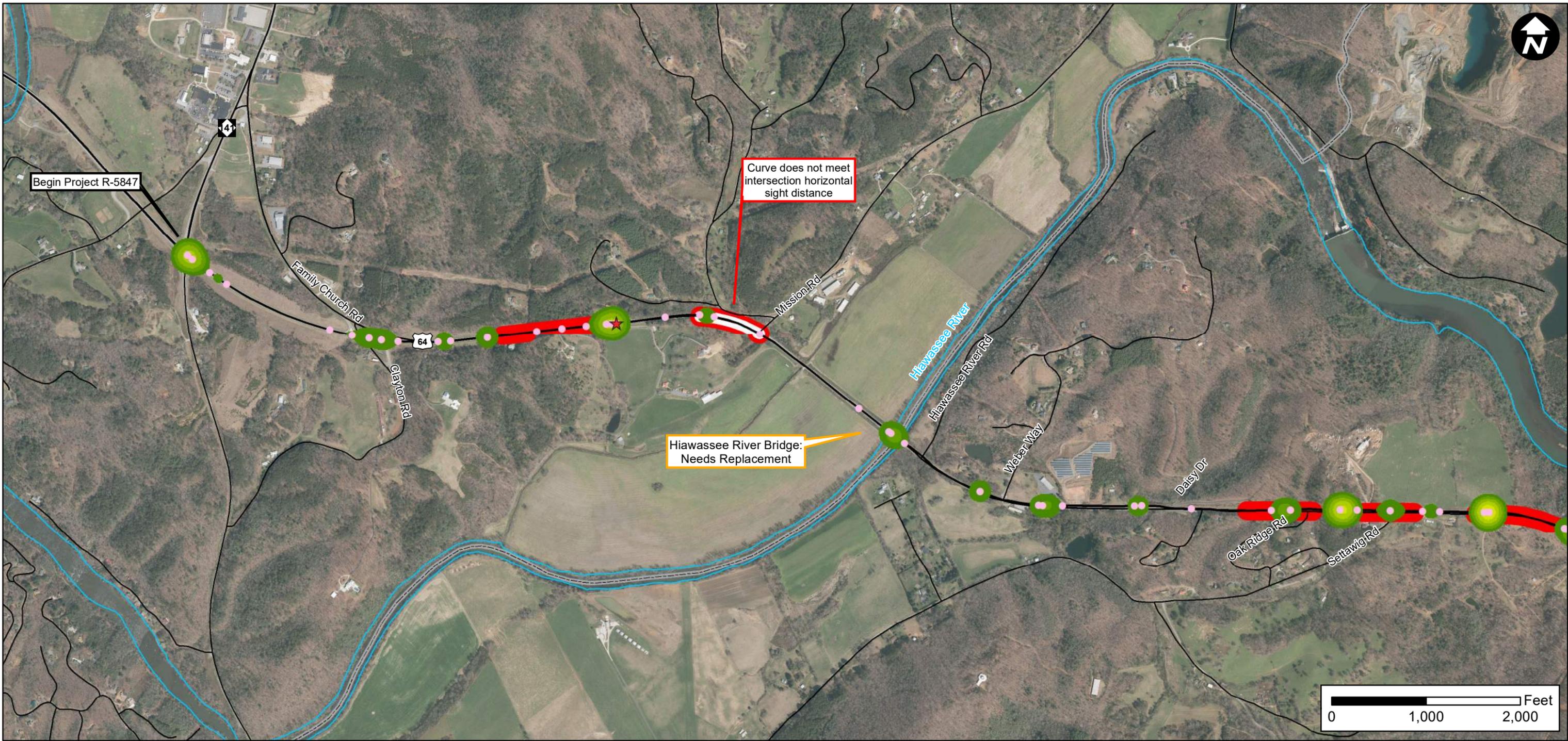


-  Profile does not meet vertical design criteria
-  Curve does not meeting horizontal design criteria
-  Crash Locations
-  County Boundary
-  Figures A-C Extents

Figure 4
Design Deficiencies
and Historic Crashes
 NCDOT Project No. R-5847
 Widening of U.S. 64
 Clay and Cherokee Counties



Crash Data from October 1, 2013 - September 30, 2018



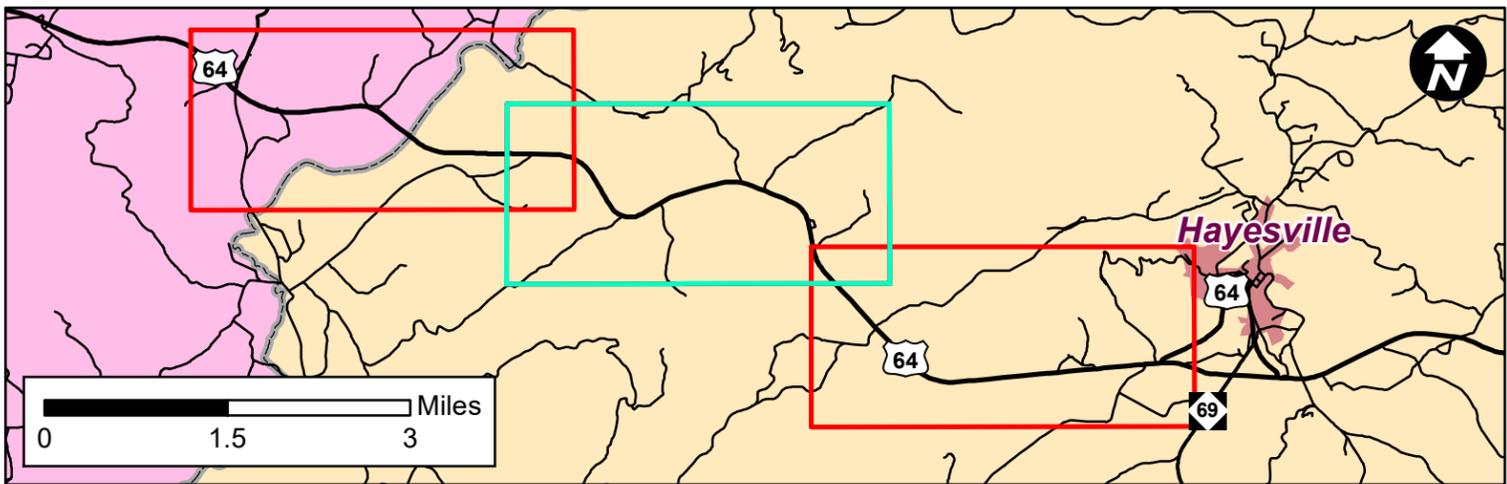
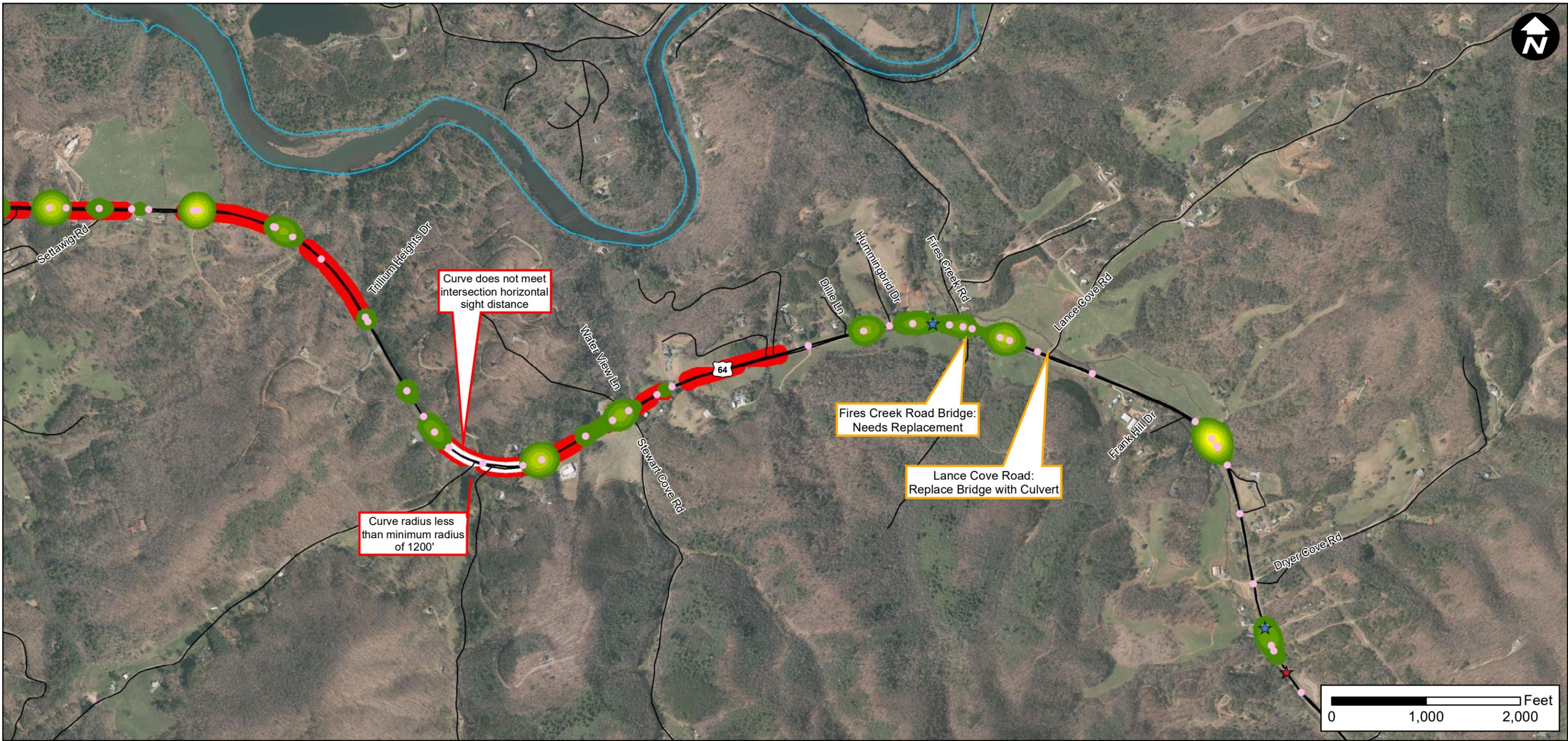
Legend

<p>Lower Crash Frequency</p> <p>↑</p> <p>↓</p> <p>Higher Crash Frequency</p>	<ul style="list-style-type: none"> ● Crash Location ★ Fatal Crash ★ Class A Crash County Boundary Profile does not meet vertical design criteria Curve does not meeting horizontal design criteria 	<ul style="list-style-type: none"> Structural Deficiency Design Deficiency
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Crash Data from October 1, 2013-September 30, 2018

Figure 4A
Design Deficiencies and Historic Crashes
 NCDOT Project No. R-5847
 Widening of U.S. 64
 Clay and Cherokee Counties



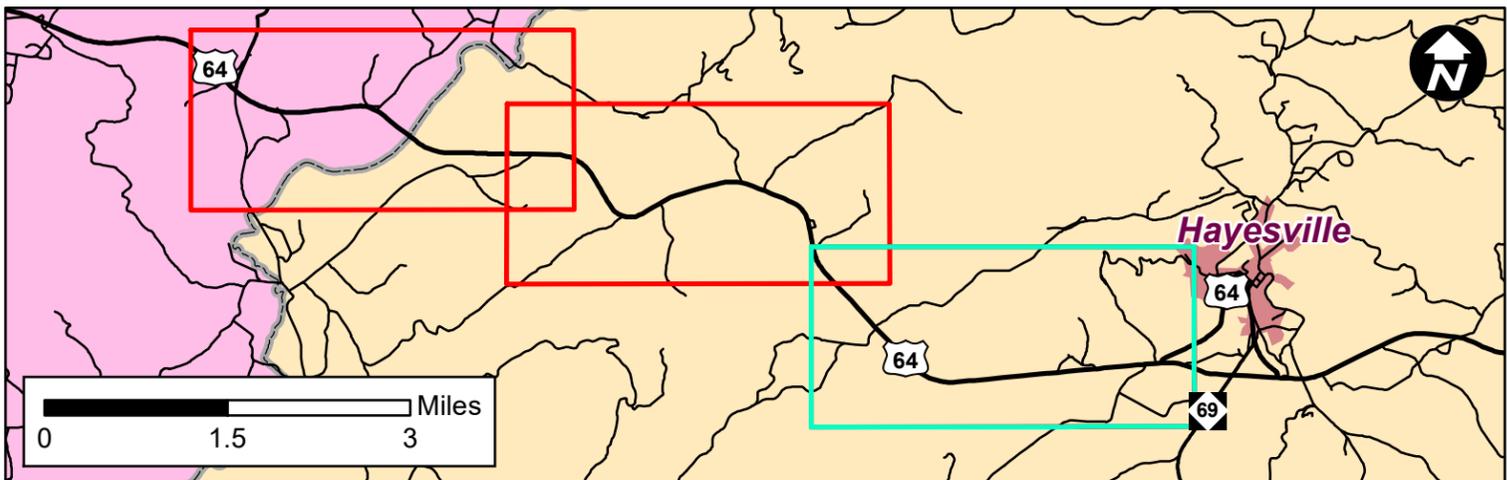
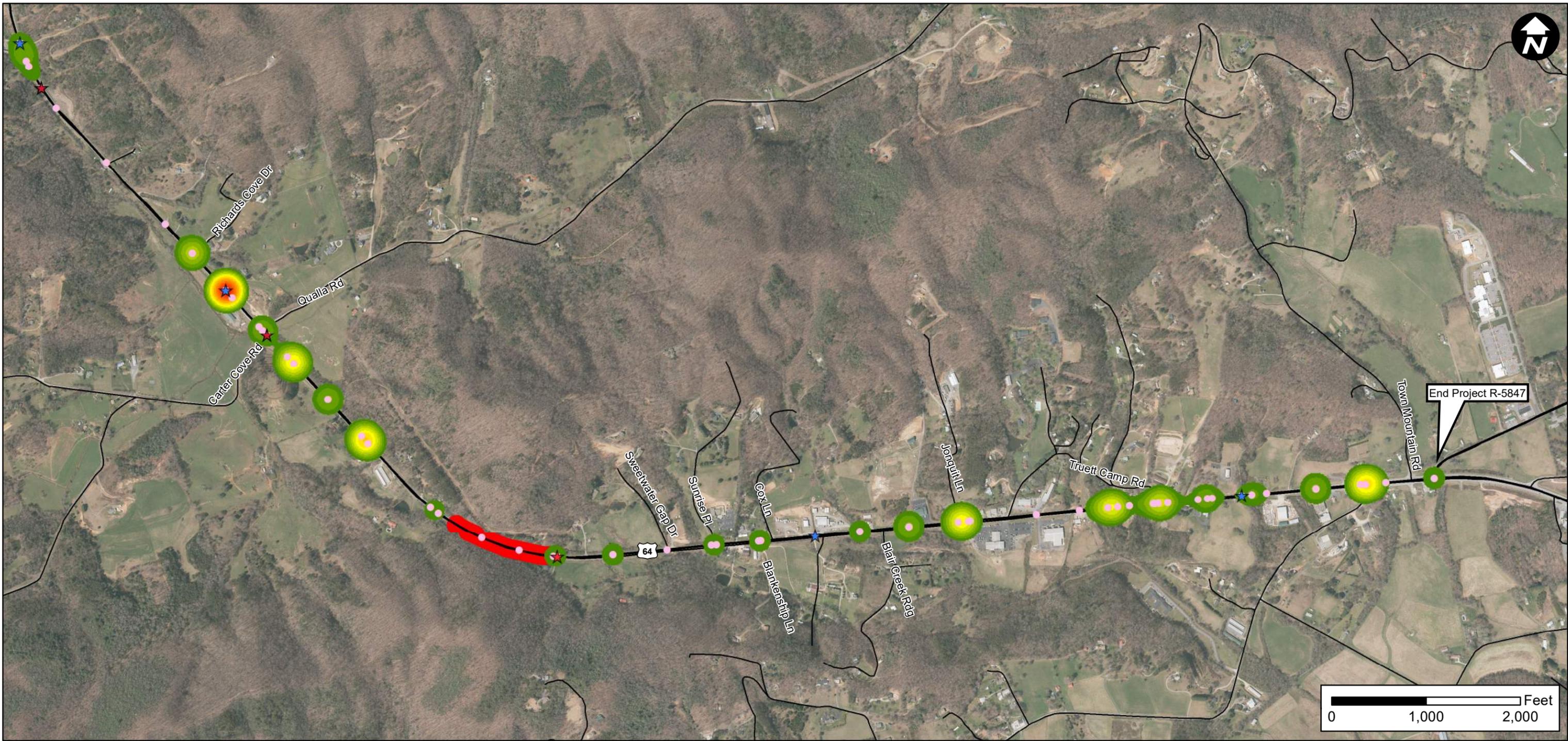


Legend

	Lower Crash Frequency		Crash Location		Structural Deficiency
	Higher Crash Frequency		Fatal Crash		Design Deficiency
			Class A Crash		
			County Boundary		
			Profile does not meet vertical design criteria		
			Curve does not meeting horizontal design criteria		

Crash Data from October 1, 2013-September 30, 2018

Figure 4B
Design Deficiencies and Historic Crashes
 NCDOT Project No. R-5847
 Widening of U.S. 64
 Clay and Cherokee Counties

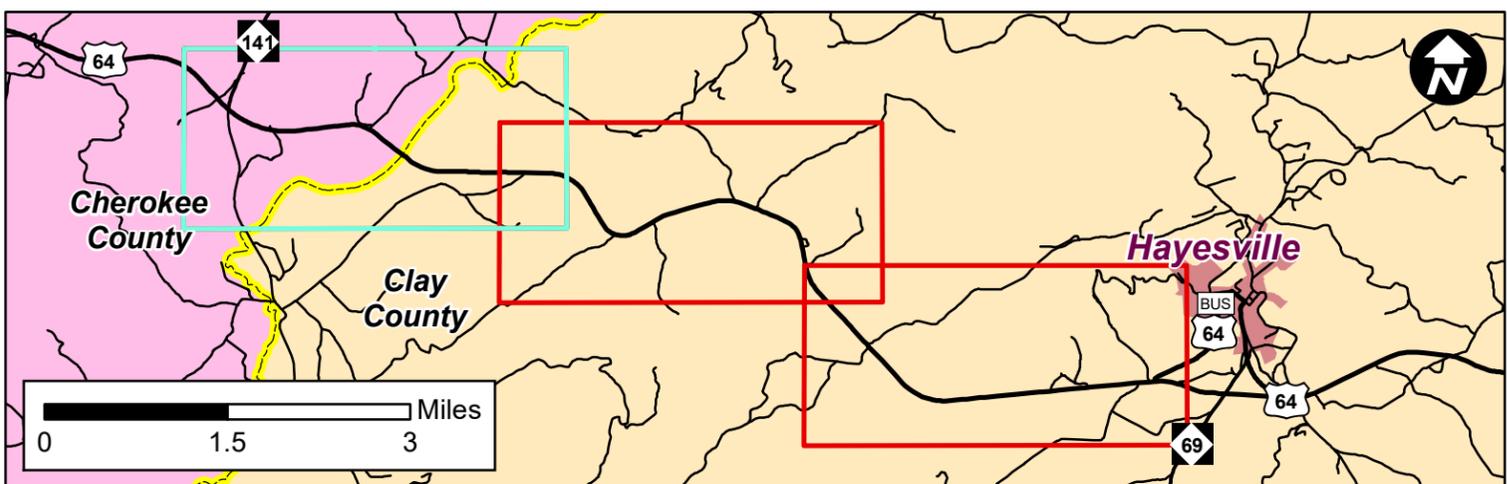
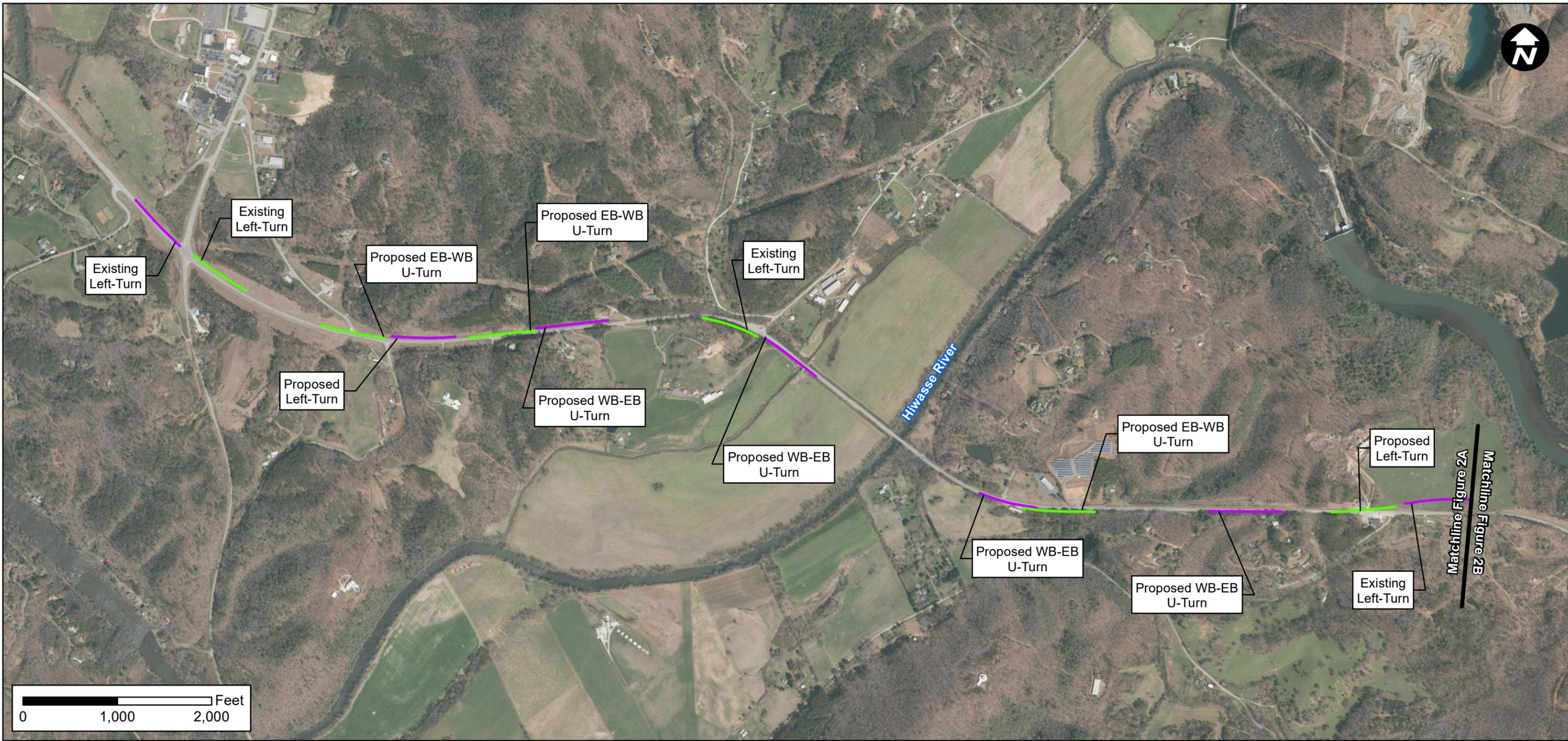


Legend

	Lower Crash Frequency		Crash Location		Structural Deficiency
			Fatal Crash		Design Deficiency
	Higher Crash Frequency		Class A Crash		Curve does not meeting horizontal design criteria
			County Boundary		Profile does not meet vertical design criteria

Crash Data from October 1, 2013-September 30, 2018

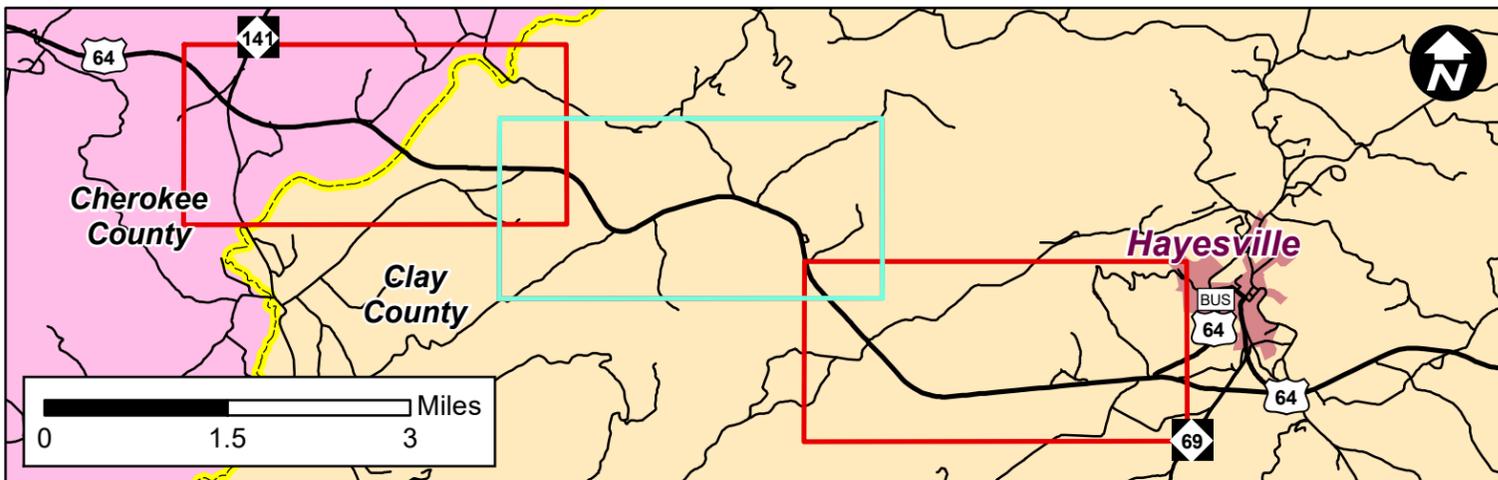
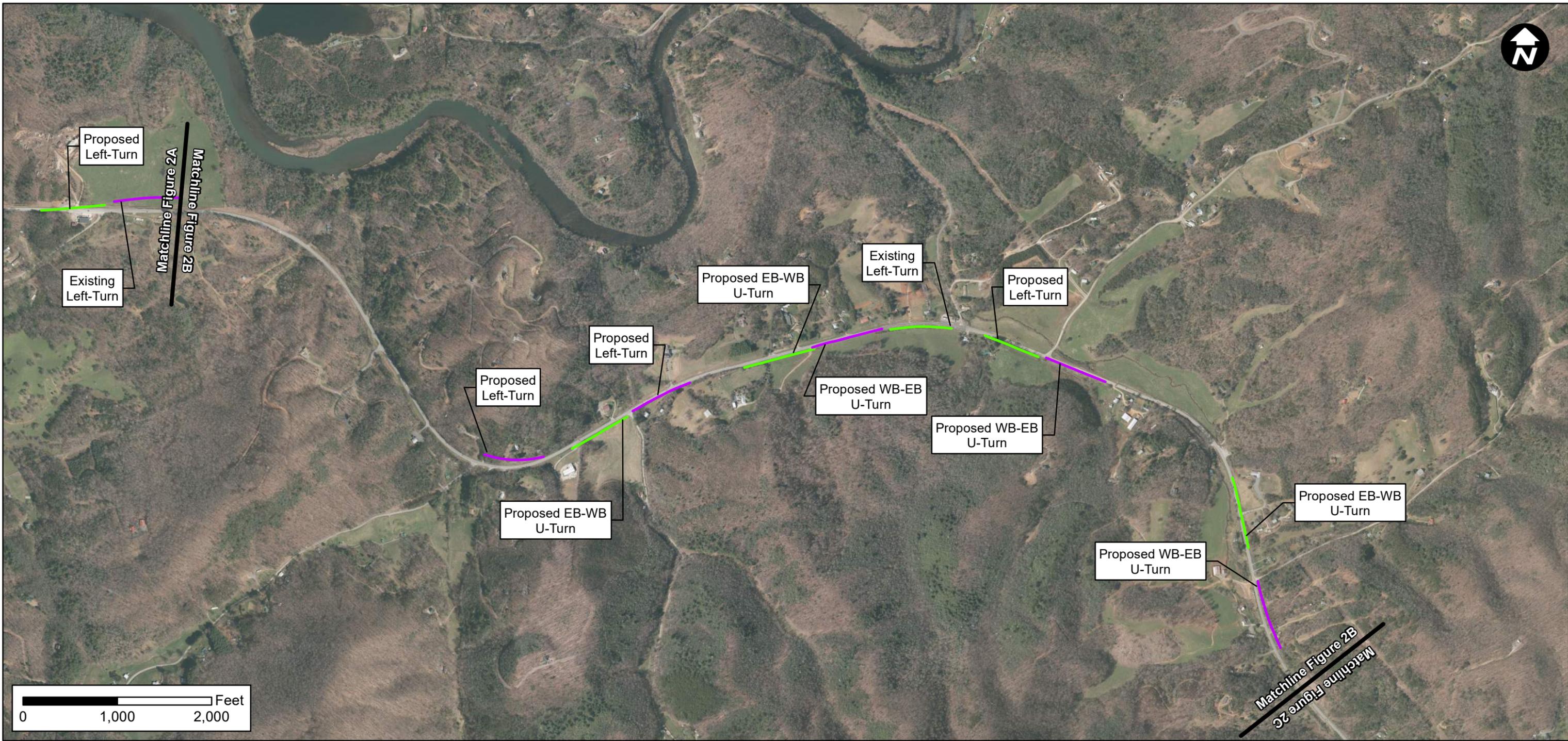
Figure 4C
Design Deficiencies and Historic Crashes
 NCDOT Project No. R-5847
 Widening of U.S. 64
 Clay and Cherokee Counties



- Legend**
- Proposed Eastbound Turn Lane
 - Proposed Westbound Turn Lane

Figure 5A: Turn Lane Locations
 STIP No. R-5847
 Widening of U.S. 64
 From NC 141 to US 64 Bus
 Cherokee and Clay Counties





Legend

- Proposed Eastbound Turn Lane
- Proposed Westbound Turn Lane

Figure 5B: Turn Lane Locations
 STIP No. R-5847
 Widening of U.S. 64
 From NC 141 to US 64 Bus
 Cherokee and Clay Counties



Appendix

Background Data

Project R-5847 CP 1 Concurrence Form

Project R-5847 CP 2 Concurrence Form

2045 Build Scenario Traffic Forecast Diagrams

Background Data Supporting Need

Regional Mobility

Traffic Data

Traffic Volumes

The project-level traffic forecast was completed in March 2019. Currently US 64 carries between 7,200 – 11,100 vehicles per day (vpd). These volumes are projected to increase to 9,500 – 14,700 vpd in the 2045 No Build scenario and 10,600 – 16,200 vpd in the 2045 Build scenario. A summary of traffic volumes at various locations along the corridor is included below in **Table 2**.

Table 2. Traffic Volumes

US 64	2017 No Build Volume (vpd)	2045 No Build Volume (vpd)	2045 Build Volume (vpd)
West of NC 141	9,400	12,400	13,600
West of Fires Creek Road	7,700	10,200	11,200
West of Old Highway 64	9,000	11,900	13,100
West of US 64 Bus	11,100	14,700	16,200

Vehicle Mix

Truck traffic makes up 7% of these volumes, with 5% categorized as dual axle trucks (Duals) and 2% categorized as trucks and tractor trailer semi-trucks (TTSTs). Traffic volumes in the region vary seasonally, with tourists increasing traffic volumes in the region during the summer and fall months. Additionally, US 64 sees an increase in traffic during fishing competitions held nearby at Chatuge Lake, located south of Hayesville.

Travel Speeds

The posted speed limit on this segment of US 64 is 55 mph except for about 1 mile near Hayesville, where the speed limit is 45 mph. Average travel speeds (based on HERE Map Data) for 7 a.m. to 7 p.m. is shown in **Table 4**. HERE Map Data aggregates and analyzes traffic data from vehicle sensors, smartphones, navigation devices, road sensors, and other sources to accurately reflect real-world road conditions.

Table 4. Average Travel Speed (January 1, 2014 through December 31, 2018)

	Eastbound (mph)	Westbound (mph)
Sunday	52.3	49.3
Monday	51.0	48.2
Tuesday	51.2	48.0
Wednesday	51.1	48.3
Thursday	51.4	47.5
Friday	51.2	47.8
Saturday	51.7	47.5
Average	51.4	48.1

Ability to Maintain Speed

Under existing conditions, vehicles that travel the US 64 corridor currently experience travel time delay due to the presence of farm equipment and larger, slower moving vehicles such as school buses and logging trucks. This delay in travel time is due to a lack of passing opportunities and decreased speed by

slower moving vehicles. Limited opportunities to pass can cause Emergency Management Service vehicles to experience delayed response times.

“Percent time spent following” (PTSF) is the average percent of total travel time that vehicles must travel in platoons behind slower vehicles due to inability to pass. A summary of the PTSF along US 64 is shown in **Table 3**.

Table 3. Percent Time Spent Following

Segment	2017 EB PM PTSF	2045 EB PM PTSF	2017 WB PM PTSF	2045 WB PM PTSF	Distance
Family Church Rd to Mission Rd*	40%	47%	48%	54%	0.8 miles
Mission Rd to Settawig Rd	42%	48%	52%	61%	1.4 miles
Settawig Rd to Green Cove Rd	47%	55%	49%	56%	1.0 miles
Green Cove Rd to Stewart Cove Rd	53%	62%	45%	54%	0.3 miles
Stewart Cove Rd to Fires Creek Rd	53%	62%	43%	50%	0.7 miles
Fires Creek Rd to Lance Cove Rd	49%	59%	49%	56%	0.2 miles
Lance Cove Rd to Sweetwater Church Rd	49%	60%	49%	58%	0.5 miles
Sweetwater Church Rd to Dyer Cove Rd	52%	63%	47%	56%	0.1 miles
Dyer Cove Rd to Qualia Rd	50%	61%	46%	54%	0.8 miles
Qualia Rd to Truett Camp Rd (West)	52%	62%	36%	46%	1.6 miles
Truett Camp Rd (West) to Truett Camp Rd (East)	55%	63%	27%	35%	0.3 miles
Truett Camp Rd (East) to Old US 64*	54%	63%	23%	31%	0.4 miles
Total	48%	57%	44%	52%	8.1 miles

* Sections from NC 141 to Family Church Road (0.6 miles) and from Old US 64 to US 64 Bus (0.1 miles) were not included in the TransModeler analysis

System Linkage

Economy and Community

US 64 is the primary connection between many major regional destinations in western North Carolina, shown on Figure 3. The project corridor connects Hayesville and Murphy, the county seats of Clay and Cherokee Counties respectively. Harrah’s Cherokee Valley River Casino & Hotel is in Murphy. Additionally, it provides access to Tri-County Community College and Murphy Medical Center located on NC 141, which is the only hospital in western North Carolina.

US 64 is part of the broader regional roadway network, providing access to the major routes in western North Carolina. This network provides access to Asheville, Tennessee, Georgia, and the national forests in the region. These routes and their roles are described below:

- **US 19** is a major north-south highway that stretches from Florida to Pennsylvania. In North Carolina, it connects Murphy, Bryson City, and Asheville to the surrounding communities.
- **US 74** is a major east-west highway from Chattanooga, Tennessee to Wrightsville Beach, North Carolina. It is a main truck route in western North Carolina and connects the western counties to the cities of Asheville, Charlotte, and Wilmington.
- **US 23** is a major north-south highway between Florida and Michigan. It provides regional connection from Georgia to Asheville and to Mars Hill to the north.
- **US 25** is a major north-south highway between Georgia and Kentucky, providing regional connection through Asheville.
- **I-26**, though nominally an east-west interstate, is physically primarily a north-south corridor from Charleston, South Carolina to Kingsport, Tennessee. Regionally, it connects Asheville to

Spartanburg, South Carolina to the south and Johnston City, Tennessee to the north. It is the only north-south interstate in western North Carolina.

- **I-40** is a major east-west interstate from North Carolina to California. The only east-west interstate in western North Carolina, I-40 connects the western counties to Asheville, Winston-Salem, Greensboro, Durham, Raleigh, and Wilmington to the east.

As recently as 2018, Cherokee and Clay County were listed as Tier 1 counties on the 2019 North Carolina Department of Commerce County Distress Ranking, which ranks the economic distress level of a county based on average unemployment rate, median household income, percentage growth in population, and adjusted property tax base per capita. Both counties were changed to Tier 2 in 2019, indicating an improvement in the economic situation.

Safety and Facility Deficiencies

Facility Deficiencies

The existing travel lanes vary between 10 and 11 feet wide compared with AASHTO's guidance of 12 feet. The existing shoulder includes a 4-foot paved shoulder with varying grass shoulders compared with AASHTO's guidance of 4-foot paved and 4-foot grass. Several locations along US 64 have geometric features that do not meet current AASHTO design standards, shown on Figure 4. Some vertical curves along the corridor do not have sufficient stopping sight distance and multiple curves do not meet the intersection horizontal sight distance requirements. The US 64 curve at Green Cove Road does not meet the minimum required radius of 1,200 feet. Additionally, bridge no. 41 carrying Fires Creek Road over Sweetwater Creek is functionally obsolete and scour critical.

Transportation Plans

Local plans propose widening US 64 to 4 lanes in Clay and Cherokee Counties. More information about the local plans is below.

Cherokee County CTP

In the approved 2013 Comprehensive Transportation Plan (CTP) for Cherokee County, US 64 is identified for improvement from the intersection with US 19 to the Clay County line, which includes widening to four lanes along the entire corridor and providing bicycle accommodations from Old US 64 to NC 141.

In addition, US 64/74 west of Murphy is identified for improvement to act as a connector between western North Carolina and Chattanooga, Tennessee and Atlanta, Georgia.

Clay County CTP

In the approved 2013 Comprehensive Transportation Plan (CTP) for Clay County, US 64 is identified for widening to four lanes from the Cherokee County line to the Macon County line. NC 69, which intersects US 64 at Hayesville, is also identified for widening to four lanes from Hayesville to the Georgia state line. There are no bicycle facilities planned on the US 64 corridor.

In addition, there are eight other minor road widening projects identified, which propose to widen the lanes on two lane roads and add paved shoulders.

Both the Clay County and Cherokee County CTP note that improving US 64 aligns with the North Carolina *Strategic Highway Corridor Vision Plan*. [This section of US 64 is not included on the more current *Strategic Transportation Corridors*, which replaced the *Strategic Highway Corridors*.]

Crash Data

Crash data was collected for the project corridor for the five-year period from October 1, 2013 and September 30, 2018.

- A total of 208 crashes were recorded in the project area.
- Crash rate is defined as the number of crashes per 100 million vehicle miles traveled (MVMT). The total crash rate for this corridor is 171.06 crashes per MVMT compared with a critical crash rate of 167.42 crashes per MVMT. The statewide crash rate for similar facilities is 148.81 crashes per MVMT.
- Four fatal crashes occurred on US 64, one of which involved a pedestrian and two which involved a passing maneuver.
- Over 35% of the total crash types involved animals, primarily deer.
- Approximately 45% of all rear end crashes occurred between Town Mountain Road and Sunrise Place, a 1.4-mile stretch.

Crash types and their frequency are summarized in **Table 5**.

Table 5. Crash Type Summary

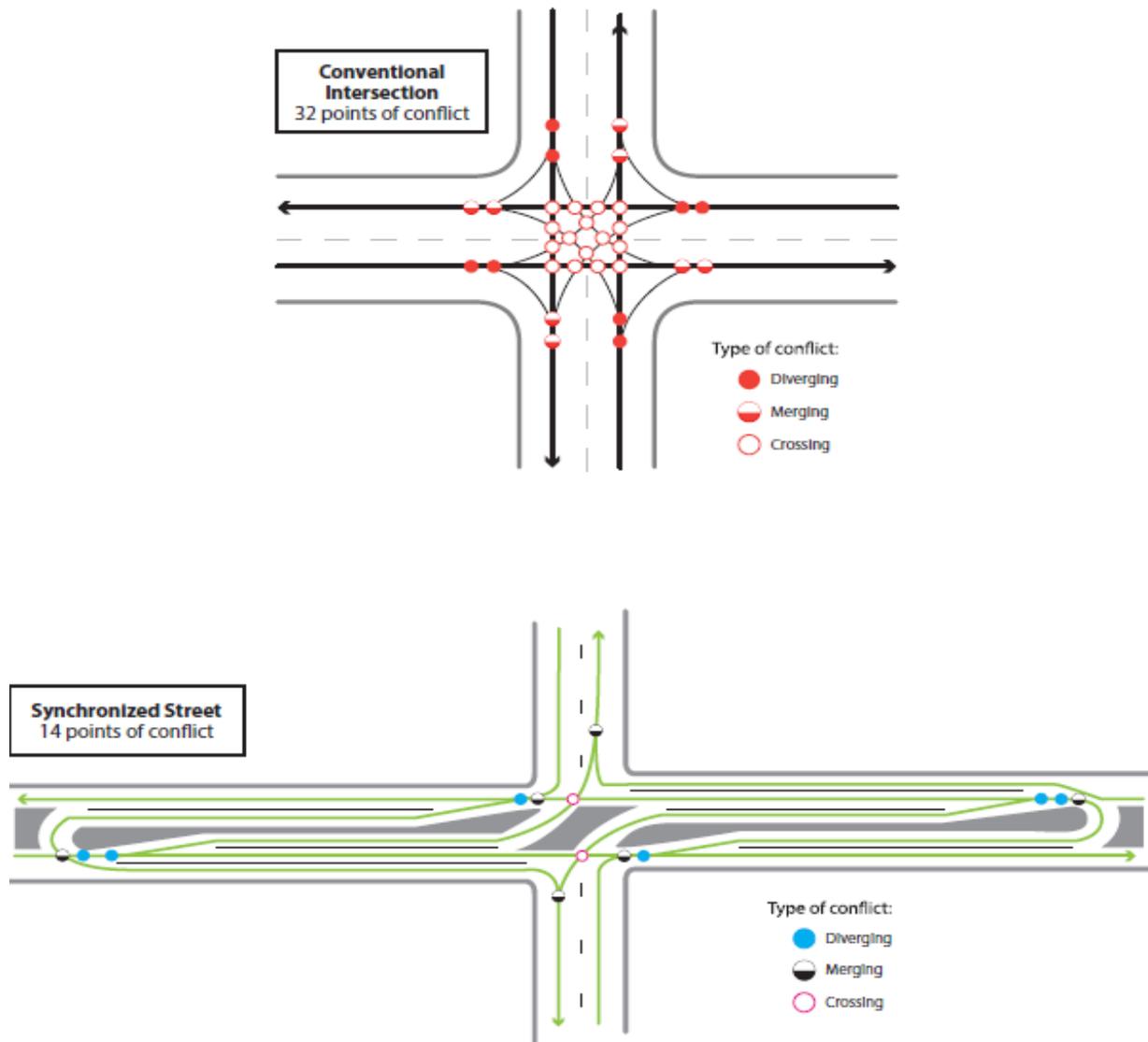
Roadway Segment	Frontal Impact Crashes*	Rear End	Sideswipe	Animal	Lane Departure	Other**
US 64 from NC 141 to US 64 Business	9%	26%	2%	36%	21%	6%

*Frontal Impact Crashes include angle crashes, head-on crashes, left-turn crashes (same or different roads), and right-turn crashes (same or different roads)

**Other crashes include backing up, movable object, other collision with vehicle, other non-collision, overturn/rollover, parked motor vehicle, and pedestrian crashes.

Conflict Points

Based on studies, superstreet intersections reduce up to **70%** of fatal crashes and **42%** of injury crashes. This is due in large part to reduction of potential conflict points, shown below.



Environmental Features

Within the study area there are 49 streams and 71 wetlands. There are no streams designated as High Quality Waters, Outstanding Resource Waters, or water supply watershed WS-I or WS-II in or within 1.0 mile of the study area. Mission Branch and its tributaries are included on the North Carolina 2016 Final 303(d) list of impaired waters due to exceeding the criteria for fecal coliform. No other streams located in or within 1.0 mile of the study area are included on the 2016 Final 303(d) list of impaired waters.

There are thirteen federally protected species listed for Cherokee and Clay Counties. These species and their biological conclusion are listed in **Table 6**.

Table 6. Federally protected species listed for Cherokee and Clay Counties

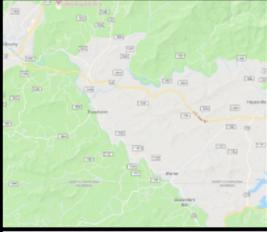
Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
<i>Haliaeetus leucocephalus</i>	Bald Eagle	BGPA	See note	
<i>Glyptemys muhlenbergii</i> *	Bog turtle	T (S/A)	Yes	Not Required
<i>Myotis grisescens</i> *	Gray bat	E	Yes	Unresolved
<i>Myotis sodalis</i> *	Indiana bat	E	Yes	Unresolved
<i>Myotis septentrionalis</i> *	Northern long-eared bat	T	Yes	Meets 4(d) Rule
<i>Villosa trabalis</i> ¹	Cumberland bean	E	Yes	No Effect
<i>Pegias fabula</i> ¹	Little-wing pearlymussel	E	Yes	No Effect
<i>Epioblasma Florentina walkeri</i> ¹	Tan riffleshell	E	Yes	No Effect
<i>Isotria medeoloides</i> ¹	Small whorled pogonia	T	Yes	No Effect
<i>Sarracenia oreophila</i> ²	Green pitcher plant	E	Yes	No Effect
<i>Platanthera integrilabia</i> ¹	White fringeless orchid	T	Yes	No Effect
<i>Gymnoderma lineare</i> ²	Rock gnome lichen	E	No	No Effect
<i>Bombus affinis</i> ²	Rusty-patched bumble bee	E	TBD	Unresolved

Note: BGPA – Bald and Golden Eagle Protection Act; Due to the lack of observed nests and known occurrences and the minimal impact anticipated for this project, it has been determined that this project will not affect this species

E – Endangered, T – Threatened, T (S/A) – Threatened due to similarity of appearance

* – Both Clay and Cherokee Counties, ¹ – Cherokee County only, ² – Clay County only

More detail on the natural environment is in the *Natural Resources Technical Report* (March 2018). Since the completion of this report, the United States Fish and Wildlife Service has listed the rusty-patched bumblebee as endangered in Clay County.



R-5847

2045 Build

Vehicles Per Day in 100s 1- Less than 50 VFD

DHV \xrightarrow{PM} D
(d,t)

DHV Design Hourly Volume (9) = K30
 PM PM Peak Period
 D Peak Hour Directional Split (9)
 → Indicates Direction of D
 (d,t) Dual TT-STz (9)

— Existing Roadway
 — Road Widening

EXTENTS

US 64 from NC 141/Old Highway 64 (SR 1548) in Cherokee County to US 64 Business in Clay County

Cherokee County and Clay County Division 14

PROJECT

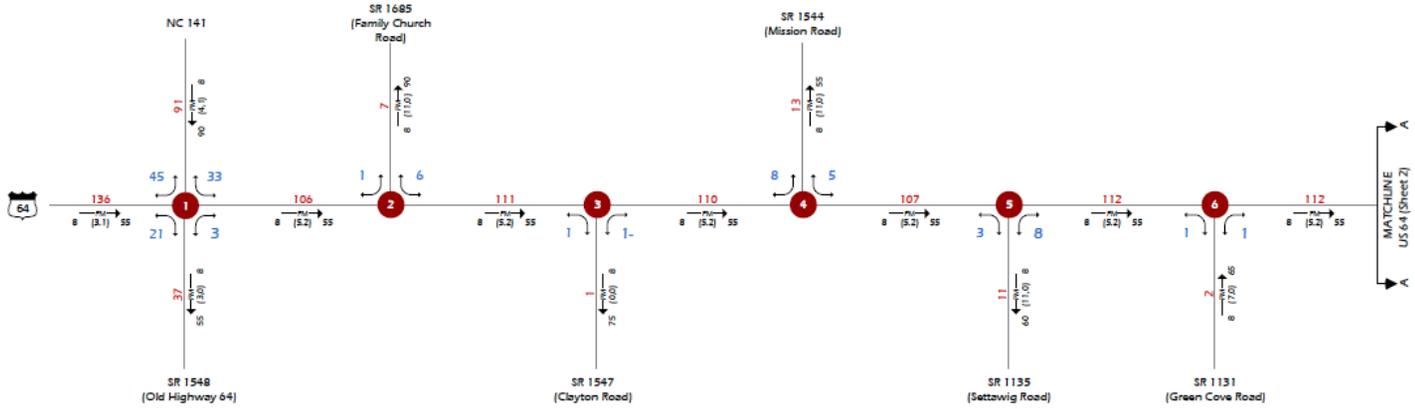
Widening US 64 from NC 141/Old Highway 64 (SR 1548) in Cherokee County to US 64 Business in Clay County

WBS# 47090.1.1

SHEET 7 OF 9

March 15, 2019

Kimley **Horn**





R-5847

2045 Build

Vehicles Per Day in 100s 1- Less than 50 VPD

DHV \xrightarrow{PM} D
(d,t)

DHV Design Hourly Volume (R) = K30
 PM PM Peak Period
 D Peak Hour Directional Split (R)
 \rightarrow Indicates Direction of D
 (d,t) Dual, TT-3Ts (R)

Existing Roadway
 Road Widening

EXTENTS

US 64 from NC 141/Old Highway 64 (SR 1548) in Cherokee County to US 64 Business in Clay County

Cherokee County
 and Clay County Division 14

PROJECT

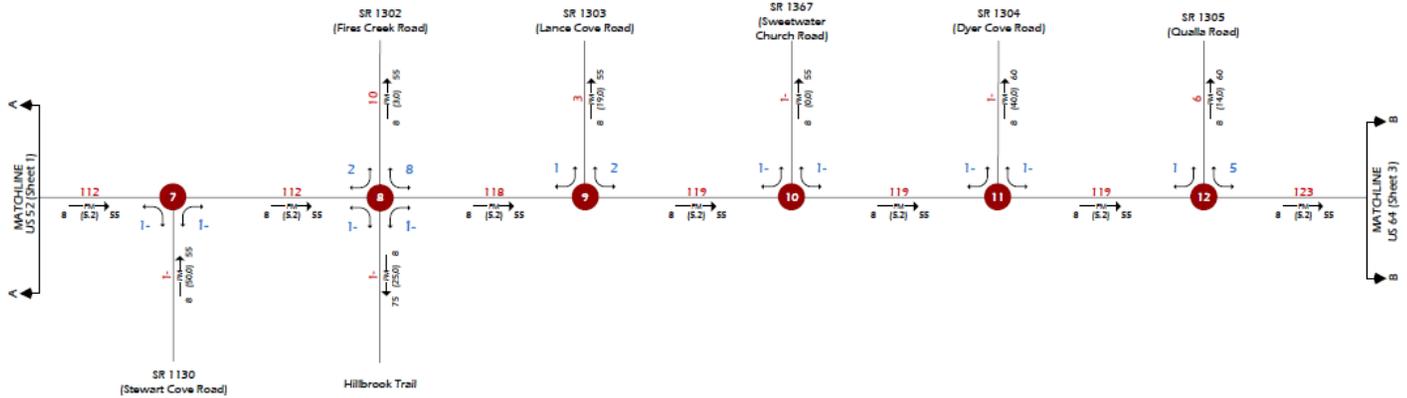
Widening US 64 from NC 141/Old Highway 64 (SR 1548) in Cherokee County to US 64 Business in Clay County

WBS# 47090.1.1

SHEET 8 OF 9

March 15, 2019

Kimley **Horn**





R-5847

2045 Build

Vehicles Per Day in 100s 1- Less than 50 VPD

DHV \xrightarrow{PM} D

DHV Design Hourly Volume (R) • K30
 PM PM Peak Period
 D Peak Hour Directional Split (R)
 \rightarrow Indicates Direction of D
 (d,t) Dual, TT-3Ts (R)

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 Road Widening

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Cherokee County and Clay County Division 14

PROJECT

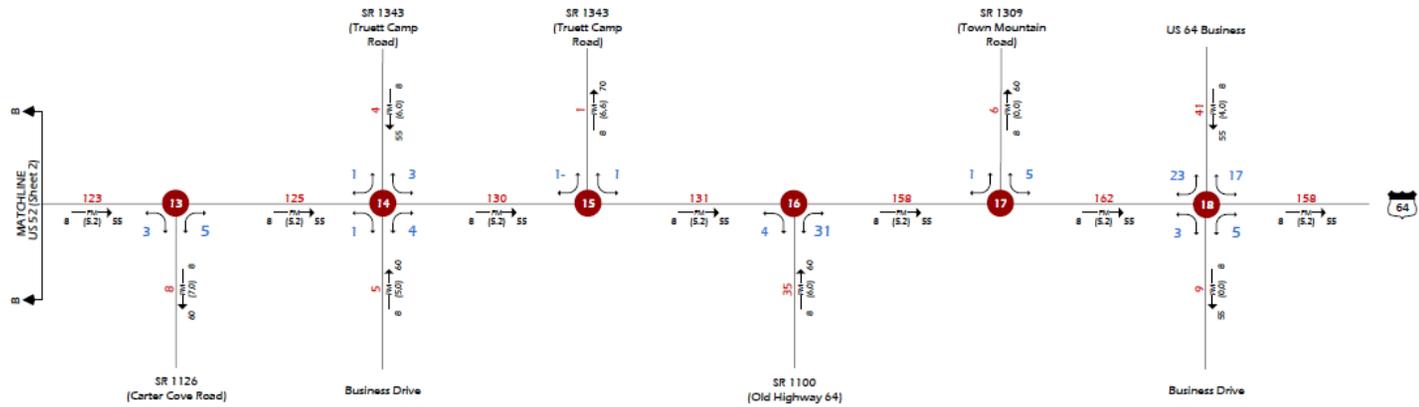
Widening US 64 from NC 141/Old Highway 64 (SR 1548) in Cherokee County to US 64 Business in Clay County

WBS# 47090.1.1

SHEET 9 OF 9

March 15, 2019

Kimley **Horn**



Section 404/NEPA Interagency Agreement

**Concurrence Point 1
Project Purpose and Need & Study Area Defined**

Project Title: R-5847 (US 64), Widening from US 64 Business to NC 141
TIP Project No.: R-5847
WBS No.: 47090.1.1

Purpose and Need of the Proposed Action and Study Area:

Purpose: The purpose of this project is to improve mobility on US 64 from NC 141 to US 64 Business by addressing facility deficiencies, reducing conflict points, and providing additional passing opportunities.

Study area: The proposed study area is a 1,300-foot wide corridor along centerline, extending along side streets where improvements are anticipated, as shown on the attached map.

The Project Team has concurred on the above-mentioned purpose and need and the attached study area map for the proposed project.

<u>Name</u>	<u>Agency</u>	<u>Date</u>	<u>Name</u>	<u>Agency</u>	<u>Date</u>
_____	USACE	_____	_____	SWRPO	_____
_____	USFWS	_____	_____	NCSHPO	_____
_____	NCDEQ	_____	_____	USEPA	_____
_____	NCWRC	_____	_____	NCDOT	_____
_____	TVA	_____	_____		_____

Section 404/NEPA Interagency Agreement

**Concurrence Point 2
Project Purpose and Need & Study Area Defined**

Project Title: R-5847 (US 64), Widening from US 64 Business to NC 141
TIP Project No.: R-5847
WBS No.: 47090.1.1

Detailed Study Alternatives:

The Best-Fit Build Alternative proposes improving US 64 using a varying typical section to minimize impacts while addressing needs along the corridor. Two typical sections are proposed:

- Best-Fit Build Alternative:
 - A 17.5-foot median along the corridor.
 - Passing lanes to the right side of the through travel lane as needed.
 - A 2+1 median-divided typical section where appropriate.
 - A 4-lane median-divided typical section where appropriate.
- No Build

The Project Team has concurred on the above-mentioned detailed study alternative for the proposed project.

<u>Name</u>	<u>Agency</u>	<u>Date</u>	<u>Name</u>	<u>Agency</u>	<u>Date</u>
_____	USACE	_____	_____	SWRPO	_____
_____	USFWS	_____	_____	NCSHPO	_____
_____	NCDEQ	_____	_____	USEPA	_____
_____	NCWRC	_____	_____	NCDOT	_____
_____	TVA	_____	_____		_____